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THE BRANDIS PRIZE FOR SYLVICULTURE.

This prize has been founded by the investment of Rs. 2,000 in 4½ per cent. Government promissory notes, being part of a sum subscribed by friends of Mr. Brandis as a memorial of his services to Indian Scientific Forestry.

The interest on this sum, Rs. 90, will be given annually for the best English Essay on any subject connected with Indian Sylviculture by any past or present regular student of the Dehra Dún Forest School, or of any other Forest School in India.

The essays should be clearly written, and should not contain more matter than will fill 20 pages of the size of the *Indian Forester* in ordinary type.

The prize essay, and the next best one, if good enough, will be printed and published by the Dehra Dún Forest School. All competing essays, with permission of the Government of the Province or State in which the writer resides, will be submitted to the Conservator of Forests, or such other officer as the Government may appoint, who will send the two best essays to the Director of the Forest School, Dehra Dún, together with a certificate that they are the *bonâ fide* work of the alleged writer. On receipt of all competing essays, thus selected, the prize essay will then be decided on by a Committee consisting of the Director of the Forest School, Dehra Dún, and two other Forest Officers to be nominated annually by the Inspector General of Forests to the Government of India.

All essays intended for competition in any particular year should reach the Director of the Forest School during the month of March of that year, and the name of the successful competitor will be published on the first of July following.

In case, in any year, no essay is considered by the Committee to deserve a prize, none will be awarded, and the intended prize-money will be invested, so as to increase the amount of future prizes.

DEHRA DUN,
September 1st, 1885.

W. R. FISHER,
Offg. Director, Forest School.

THE

INDIAN FORESTER.

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THE NATURE AND LIMITATION OF THE SERVITUDE AND THE OWNERSHIP-RIGHT IN FOREST ESTATES.*

Introduction.

Two very full and important papers appeared in the *Zeitschrift für Forst und Jagdwesen*, for February and March, 1884, under the title given in the note.† Dr. Brandis was good enough to put these into my hand, and suggested that an abstract of the more generally useful or universally applicable parts would be of value to forest students in India. In the following pages I have accordingly attempted the task. I make no pretension to give an exact translation, but rather a free abstract, of Dr. Danckelmann's papers; where necessary I have added (either in foot-notes or distinguished by square brackets) certain comments or explanatory remarks of my own. What I have omitted altogether are either mere repetitions (which often occur in the original) or detailed references to provincial statute books and legal decisions, or special details regarding certain forms of rights and conditions which are unknown and are never likely to exist in India.

The study of the true nature of the forest-right, its relation to the right of ownership in the forest, is one that cannot fail to be important to forest officers. It was long before the matter was fully understood in Europe, and many readers will be aware what great trouble arose, from the fact that at the time of the first French Revolution, a jurist of such great capacity and learning as Proudhon, in his desire to overthrow all traces of feudal superiority of the aristocracy, insisted on misunderstanding the true relation of the *usager* to the forest estate and its owner; and how he actually succeeded in getting a law

* From the Original of Dr Danckelmann, in the *Zeitschrift fur Forst und Jagdwesen*, (February—March 1884).

† *Ueber die Grenzen des servitutrechts und des Eigenthumerecht bei Waldgrund berechtigkeiten*, vom Ober forstmeister Dr. B. Danckelmann.

passed, that the *usager* was to be in fact considered as a sort of *joint-owner* with the forest proprietor, and so be entitled to demand the *partition of the forest*.

This law was repealed in 1827, and then the true nature of the right of user was recognized, but not till after considerable mischief was done, and many forests had been lost for ever to the public good. It will be well that we should not have to go through the same experience in India.

It is true that in India, we have not yet arrived at the stage when all forest estates are practically finally constituted; and when they are all of such value and so situated, that the relations between the right-holder and the forest-owner (*i.e.*, in most cases the State or some community) are matters which frequently come before the law courts for adjustment—each party being eager to appreciate and to determine the exact extent of his legal capability. Consequently, we have as yet neither definite statute law nor the authority of a series of High Court precedents on the subject.

But such questions are sure to arise sooner or later, and then we shall have to look about for the means of their solution. Where there is no provision of written law, nor any definite local custom of the tribe or race (which there could hardly be in these matters), the rule of decision is legally what is known as that of "equity and good conscience." But it has long been recognized that in order to ascertain what "equity and good conscience" with reference to the circumstances in dispute *are*, the Judge cannot refer to his own fancy, or raw-impression of what is right, but must seek for some 'authority'—must consider legal principles, and be guided by the analogy of other laws and so forth. Naturally enough, therefore, reference will be made to the opinion and practice of those countries, in which forest management has long been on a business-like and reasonable footing, and in which these questions of right have been adequately studied, and solved both in the law courts and the provisions of the statute book.

The forest officer who is able to refer the Advocate who has to argue a forest case, to some such sources of information, will enable him rightly to guide and influence the course of decision. For at present, the study of forest jurisprudence—is, owing to the virtual absence of any necessity for it—in practice hardly attempted; and there is probably, not a single Government Advocate in any province who has ever had occasion to go into the matter at all. Nor do English law books afford much assistance, because 'forests' in our sense of the word hardly exist in England, and in Scotland, where great areas have been planted, the property was absolutely free of rights. The English law principles regarding common rights—while far from ignoring the general stand-point from which such matters are regarded in other European countries—still rarely suffice to

solve those questions which arise, when it is a question of *maintaining the forest*. The perpetual danger is, that if the right is left, as the ignorant peasant would perhaps like it, undefined and unregulated, the forest itself—the substance of the estate—will suffer, and so not only the public (as the principal forest owner) suffers grevious injury, but the *right-holder himself will lose the means of satisfying his wants*, which he might have enjoyed for ever, if only a (naturally distasteful) prudence, economy and moderation, had been enforced on him. In forest as in other cases, it is easy to kill the goose that lays the golden eggs; only that in forest matters, the destruction is not accomplished in a day, and a whole generation may pass away unheeded while the work of deterioration is gradually but surely going on.

The continental nations which have large natural forests to manage, have been obliged, in the nature of things, to study the relations of the forest-owner to the forest right-holder from the necessary point of view; and as the great principles of the Roman law, which have been the source of so much of our modern jurisprudence all over the world, dealt with the question of 'servitudes' and ownership, in a singularly, clear, reasonable, and philosophical manner, it has followed almost as a matter of course, that the legal principles of rights which are recognized in the forest law of France and Germany, &c., are to a large extent expansions and applications of the Roman law.

In India, such principles will soon commend themselves to be followed, at least generally. And our circumstances are singularly well adapted to facilitate the application.

We have rarely or never any difficult cases to provide for; we have rarely or never any cases, where a right has originated in a special contract, or where it binds the forest-owner absolutely to specific terms, or where it derives additional strength from having been granted for a valuable consideration. In reality our forest rights in India, are not *legal* rights at all. Under an Oriental Government no such thing as a prescriptive right would be practically possible.

The Mogal Governor, certainly never troubled himself to interfere with wood cutting or grazing in the forest—which from his point of view was a "waste,"—and was (though in theory the property of the State) nevertheless only a potential property—something that might become 'property' only when appropriated by grant, cleared, and cultivated. Though, therefore, the grazing and the wood cutting might have gone on for a period of years, that far exceeded what would now be sufficient to create a prescription, the "usager" would never for a moment have dreamt of disputing his obligation to take himself away for good and all directly a "sanad" was issued by the Nawáb granting the forest to some zamindar or other grantee to be cleared and ploughed up.

Nevertheless, when western law and western ideas were ap-

plied to property and to rights in India, there was no other course possible—certainly none that would have been equitable and befitting a civilized Government than that which has in fact been followed, namely, to treat existing ancient practices and users of the forest in the matter of grazing, wood cutting, and so forth, exactly as if they were true 'servitudes' under the modern legal conception of the thing.

Under such conditions it has happened that forest-rights are in India by no means *always* rights *in rem*, or "real-rights." The text-books on the Continent always define a forest-right as one that belongs to some *estate*, and is enjoyable—never apart from that estate but—only by the direct owner or holder of the estate for the time being. There may be personal rights to one particular enjoyment (*nieselbrauch*), but they are not treated on the same footing.

In India, however, we draw no distinction; and the forest-right is dealt with in practice on the same basis whether it is attached to an estate (as in the case of a right held by a Burmese monastery), or is a personal right (as that of some Kangra graziers, &c.), or attaches to a person as being a member of a village community.

One other point remains to be noted. Forest officers who have taken up the study of forest-rights warmly, may be disappointed to find, that neither the Settlement authorities, nor the Magistrates, will always recognize to the full, the principles that have been set before them in such writings as the present. But they should not be discouraged. It is absolutely necessary to understand what I may call the true or complete theory, even though circumstances do not as yet enable us to apply it frequently. No human hand can draw a perfect circle, yet we do not on that account despise the book of Euclid which treats of the properties of circles. Magistrates and Courts are not perfect, and in any case, as I have said, they are so little accustomed to deal, in practice, with questions of forest right, that it is not surprising, if they should often make mistakes, or fail to appreciate points, or imagine that a rule derived from foreign text-books is necessarily inapplicable in India. We must patiently wait for the spread of knowledge and for the practical recognition of sound principles in forest matters, and must not conclude our information to be wrong, because courts do not all at once fall in with it.

The *only* way, I repeat it, in which we can learn how to deal with disputed questions of 'owner' *versus* 'right-holder' and the like, is to see how other nations have, in their often century long practice and experience, dealt with them. And the sooner we have a body of men, who know how this is done, and at least enter into and appreciate the rational discussion of forest law questions, and grasp the real principles on which the discussion *must* proceed if it is to lead to any practical result, the sooner

shall we come to an end of those strange decisions, and that unwillingness to appreciate the necessity of forest maintenance *as well as* the convenience of the "usager," which is at present so common an obstacle, and which may lead the forest officers to despise such studies as the present, on the ground that they are unpractical and 'in the air.'*

BONN: *May 1885.* B. H. BADEN-POWELL, B.C.S.

ABSTRACT TRANSLATION OF DR. DANCKELMANN'S PAPERS.

In the statute books, and even in the text-books of Civil Law in Germany, Austria and France, the boundary line between the natural province of the 'servitude' or right of user, and that of ownership is nowhere sharply drawn. The Roman law, the source of those legal conceptions regarding rights, which have been largely adopted by the different countries of Europe, took no special notice of servitudes in (or over) a forest, as a particular kind of estate. [When the Roman lawyers wrote, the idea was probably prevalent—as it still is in backward and semi-civilized countries—that forest was part of the unappropriated or unowned waste—a sort of practical *res-nullius* not to be classed as "estate" at all (still less as a kind of estate having great value and importance—) over which the owners of other estates as the dominant body could exercise servitudes. Yet directly a forest becomes recognized as a property with a definite destination and purpose, just as definite as that of an orchard or a corn field, then it becomes at once noticeable that this kind of property is just *the* one, in which servitudes are most likely to come largely into play. Almost all the rights, that, in every-day life, one comes across, are either the class called "easements" regarding rights of way and flow of water, which may arise anywhere, or else are rights to get certain objects of domestic and farm utility, grazing, grass, wood, gravel, &c., which are most frequently and naturally to be found in forest estates].

In the old German law, the 'right of user' was only noticed as being *part of the owner's* own right, namely, a right to enjoy *one's own* property. But the Roman view is essentially different there, the right of user, spoken of, is the right of *one*, to make some use of the property of *another*.

The right of ownership has been raised to the conception of an exclusive, indivisible (*untheilbar*) and permanent, lawful dominion over a thing, so that the right of user or servitude, is a secondary or subordinate right.

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* Occasional references to 'Eding' and 'Pfeil' in the sequel are given without the names of the books, because, they are those which are so constantly quoted in my Hand-book, and are there fully described.

The servitude affecting the soil (real servitude or prœdial servitude) as recognized by the Roman law is a right attaching to a specified estate, to some user or enjoyment in respect of another estate; the owner of the latter being consequently compelled, to submit to something, or not to do something, which, otherwise, in virtue of his own right he would not have to submit to or would not have to forego.

In all cases,* the holder of the right of user is a specific estate or plot of ground, and is called the 'dominant' estate, with this meaning, that the holder for the time being of the estate may practice the right or surrender it: he may also alienate it along *with* the estate he holds, but he can never separate the right from the estate; neither so as to transfer it to another estate or plot of ground, nor hand it over to another person: he cannot even transfer the enjoyment of the right for any single occasion.

The estate which bears the burden of the right—the servient estate—is another estate, and in the case of forest right is of course a forest estate.

The immediate subjection of the servient estate, establishes the nature of the right as one *in rem*,† since it attaches or belongs to the dominant estate and subsists over the servient estate, no matter who is the owner for the time being of either, nor is it affected by any transfer or partition of either estate, nor by any entry or non-entry in a land register or title deed.

In the case of a forest right, it is not only the forest soil, but the forest,—the working combination of soil and what grows upon it,—that is the direct subject of the right: this consideration shows the necessity for a proper maintenance of the forest, in the interest alike of the right-holder, and of the forest which bears the right.

The essence of every right of user—whatever may be the particular object or faculty enjoyed—is a properly regulated, or duly economical, use of the servient property, for the permanent benefit of the dominant estate. It is in fact, a right to make some use of it, a *uti* or *frui*, but not a right touching the *substance* of the estate itself, for that belongs alone to the owner. The right of user also must fulfil some permanent object of the dominant estate, and yield a real advantage to it, and not merely serve some purpose peculiar to some particular owner for the time being. It is a principle, that a servitude which is of no real use to any one is not recognized, (*servitus quia nihil interest, non valet.*) It is on this account that, where

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* *Cfr* the remarks made on the subject in my introduction.—B. P.

† A right, *i. e.*, attaching to the thing itself, and persisting against all owners of the thing for the time being, and not merely creating an obligation in a particular person.

the servitude is not originally and in its title, defined, the *actual requirement* of the holder is the legal measure of its extent.

And so also the benefit to the right-holder must be of a permanent character, (there could not be a servitude* which happened to benefit him for a brief period and after that ceased to be of any use. (*Servitutes perpetuas causas habere debent*). And this 'perpetuity' affects both sides; for if the right is one that will always be exercised by the dominant estate, the servient estate must always be kept up so as to bear it.

When, therefore, it is said that the benefit must be perpetual, it means benefit to the direct owner and worker of the dominant estate, and not extending to other persons only indirectly connected with its primary business or purpose of existence. Also, on the other hand, which is very important for the right-holder, it means that the servient estate must be kept always in such a condition that it can bear the right and be able to fulfil the requirements both of the right-holder and of the owner. In connection with this comes in the principle that the right-holder must always exercise his right with moderation (*civiliter uti*): he must not make the satisfaction of his legitimate wants more burdensome to the estate than need be.

The servitude can never be a bar or an obstacle to the natural use and necessary destination of the servient estate (*eigentliche bestimmung*): the 'substance' of the estate cannot be attacked, nor its legitimate management and cultivation be interfered with. The enjoyment of the right or servitude, is always *salvâ substantiâ* and *salvâ culturâ*, of the servient estate.

It will be seen that all this implies, in the owner of the servient estate, a certain passive condition; in which he is obliged to submit to a proper exercise of the servitude and do nothing, on his part, which would hinder such an exercise.

It is the character of the servient estate's duty, that it consists not *in doing* anything, but in *bearing* (*in patiendo, non faciendo*), or in *foregoing* on his own part, some act which would interfere with the right of the other. The servitude does not require the servient owner to do anything (*in faciendo consistere nequit*). [For instance, a forest owner could not be required to undertake any cultural operations for the express purpose of producing something for a right-holder, that is not naturally on his estate]. There was one exception to this [rather apparent than real] in the Roman jurisprudence, and that was in the *servitus oneris ferendi*, where one man's house had the right of being supported by another's wall, and where the latter was obliged

* A temporary right existing only for the occasion, might arise out of a contract, grant, &c., &c., but it would not be of the nature of a servitude or "right of user."

consequently to keep his wall in a state of soundness and repair sufficient to afford the support required.

These Roman law principles of the servitude or right of user have been adopted into all the general laws of European nations, and may be found, for example, in the Codes of Prussia, Saxony, Austria and France. They proceed logically and follow from the Roman law theory of rights and of the relation subsisting between ownership right and the right of user. The owner has his 'dominion' over the thing, and his competence to use and to dispose of it, notwithstanding the servitude; so that he suffers no diminution of this actual competence therefrom. More clearly still the Roman view enunciates the effect of a right of user on the ownership right, as consisting in this only, that the exercise of the latter is subject only to such limitation as is necessary to the due exercise of the right; the owner must forego only such dispositions and such methods of enjoyment or using his property as would hinder or nullify the enjoyment of the right of user.*

The European Codes do not, however, give us any very satisfactory or methodical information, on the important questions of the manner in which, the extent to which (or the limits within which) the user-right is, on the one hand, to be exercised, and the ownership right, on the other, to be restricted.

This is attributable to the fact that at the time when the law of servitudes was first codified, forest rights had but a slender intrinsic value: moreover, the forest management was such that it seldom came into practical collision with the interests of right-holders.

Later on, when rights were found to interfere with the advancing ideas of forest management, laws were enacted for

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* Some authorities have maintained that by the existence of a servitude, a portion of the ownership-right is, so to speak, broken off, and handed over to the right-holder: which would lead to the conclusion that in the event of a conflict of interests the right of user is the stronger, and the ownership-right would have to give way. This teaching of the *diminutio domini* is, however, contested by Schönemann as regards the Roman law (see Schönemann; Die Servituten, §§ 5, 6, Leipzig, 1866), and by Förster for the Prussian law. [The teaching objected to by our author is also commonly found in English books on Roman law, for example, if I am not mistaken, in Sandar's Justinian. All the possible acts of control, disposition and enjoyment over property, that together make up a perfect or unlimited ownership are compared to a bundle of sticks, and when one or two sticks are withdrawn and given to some one else, that is analogous to the right-holder who has *part of the* enjoyment. My own suggestion is that the two views are not inconsistent, but that they really are different aspects of the same subject—the thing regarded from two different stand-points. If you regard the perfect *use* or *enjoyment* of every stick and berry in a forest as an attribute of ownership; as in one sense, it no doubt may be called a breaking off of part of the ownership, when the enjoyment of any particular product passes into the hands of a right-holder: but the actual enjoyment of a thing is not the same as the capacity or right to own it. My capacity of locomotion is not diminished, because a high stile crosses the footpath; or because certain large stones are laid about, through which I have to pick my way].

the extinction of rights by compensation.* These laws do not, however, fully dispose of the difficulties that arise. [We shall proceed to discuss the question under two sections, 1*st*, looking to the limits which legal principles give to the *right of user*, and then 2*nd*, considering the limits which confine the *owner's* right when he has to deal with "usagers"—right-holders over his estate].

Section I.

The limits of the right of user, in forest right.

The question is, what lies within the sphere of the right-holder's proper user, and what outside it?

The sphere of the right is—

1. Its subject (*i.e.*, wood for building, firewood, resin, grass, &c., &c.)
2. Manner of obtaining (grazing, grass cutting, cutting trees oneself, or obtaining delivery of timber ready cut, &c.)
3. Place of exercise.
4. Time of exercise.
5. Purpose to which applied (wood for domestic fires, but not for factory forges, *e.g.*)
6. Extent (quantity and dimensions).

These matters will all be determined, either by the holder's title (whether that title is prescriptive, by grant, or by authoritative decision of the tribunals) by the law, or by local or general custom. If neither the title nor any provision of law or custom defines the right, then it is limited—(1), by the needs of the right-holder; (2), the capability of the forest; (3), the right of the owner to have his enjoyment along with the right-holder; (4), the duty of the right-holder to spare the forest estate as much as he can (*Waldschonpflicht*); and (5), the right of the forest owner to work his forest in a certain way. All these different heads will now be made the subject of remark, *seriatim*.

(*a*). *The requirement or need of the right-holder.*

The term "need" or "requirement" refers to the right-holder's want in respect of the particular object of enjoyment which the right refers to. [In a firewood right, for example, it

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* For example, in Prussia, the
Landes kultur edict, ... 14th September, 1811;
also the—
Gemeinheits theilungs ordnung, .. 7th January, 1821.
Wald streu gesetz, ... 5th March, 1843.
Baden Forest law, ... 15th November, 1833.
Bavaria „ „ .. .. .. 28th March, 1852.
Austria „ „ .. .. .. 3rd December, 1852.
(Bavarian law, *see* Ganghofer, "Das Forstgesetz, &c., in neuer textirung vom Jahre 1879," Augsburg 1880).

means the estate owner's requirement in the matter *of fuel*, whether that fuel can be claimed for domestic hearths, for forges or furnaces, for kilns and so forth, or for two or more, or all, of these, according to the nature of the right]. In defined rights, the quantity or extent is already settled either by the original title or by subsequent action. It is in indefinite rights, that the 'requirement' of the right-holder must be referred to as the standard. This follows from the Roman law theory of right, and is also deducible from the old German customary law. The right being inseparable from the dominant estate, it follows that what is needed for the estate is the limit of the right.* As a corollary also, it follows that the produce of rights cannot be sold (because if there were an excess available to sell, that would imply that the right-holder had taken more than he needed), nor can it be applied to other purposes, than to the supply of (*a*), the working of the estate; and (*b*), the supply of the household of the estate owner.†

On this subject an important question arises, *viz.*, Whether the wants of the right-holder extend to the total requirement, without regard to other means of satisfying it which the estate may have apart from the servient estate: or whether the right is confined only to the balance which the estate cannot get from such other sources: this question may arise in two cases: one where the estate has rights over several forests, another where the estate has some forest of its own, from which a part, at least, of the requirement might possibly be met.

The laws usually contain no direct provision regarding taking account of the means already possessed by the estate. The matter is then determined by the original title, and with reference to the former practice [as it can be ascertained to have all along been followed] in the exercise of the right.

In the French law for compensation of rights (still in force in Alsace and Lorraine, 19th May, 1857), Art. 8 provides, that in compensatory rights, the material which the right-holder possesses in his own forests is not to be deducted from the total he can claim from the servient estate, unless it is expressly so provided in his title, or has in fact been done in the previous exercise of his right. In cases where a deduction has to be made, the further question arises, on what principle the deduction is to be calculated; it may either be the entire yield of the other places of resource, or only a quantity, proportionate to the yield-capability of the servient estate as compared with that of the other sources of supply.

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* [Suppose a house *a* holds a fuel right for its domestic hearths there are ten such hearths in the house The requirement of such estate is then fuel for ten hearths and no more; and we have only to ascertain what kind and quantity of wood fuel is reasonably and conveniently sufficient for each hearth *per annum*, and we have defined the right].

† *Cfr.* Windscheid. Lehrbuch des Pandectenrechts, §209, 3 Aufl, 1873.

[The "proportionate" method of deducting the amount of satisfaction obtained from other sources, is in theory the fairest; but it can be applied only in some cases, and its application, apart from inherent difficulties, may also be determined by special terms and conditions of the right-holder's title. It is usually applied in calculating the "need" of an estate in the case of grazing rights, and may be also in the case of firewood rights.

An example will make clear what is meant.

Supposing A is the servient estate, burdened with an undefined grazing right of the cattle of farm X. For the working of X according to a natural, and locally-usual method of managing a farm of the size and character, 210 head of cattle is the full 'requirement.' But besides a right over A, (which might thus conceivably extend to grazing 210 cattle but not more,) X has also a grazing ground of its own, which we will call B. Supposing the right to be such, that either according to title, or to law, or to equitable decision, A is not to be burdened with the entire need (*i.e.*, of the whole 210 cattle) irrespective of the right-holder's other means of meeting his grazing requirements, but is only entitled to be burdened with the unprovided for *balance* of the need. Now B actually is capable of affording grazing for 200 cattle,* so that if the deduction is made on the principle of taking the *total* capability of the other resource (*voller ertrag*), then the right over A, would only be taken as grazing for 210 − 200 = 10 head of cattle. But if the principle of *proportionate* deduction were adopted (as it probably ought to be in such a case), then we have to consider, that while the servient estate A has a capacity of supporting (say) 100 head of cattle, B (as above) has a similar capacity of supporting 200; in other words, the proportionate supporting-capacity of B (the right-holder's other resource) to A (the servient estate in question) is as 2 : 1. Then in deducting the *proportionate* value of the resource B, we should say that B must bear 140 and A 70 (140 + 70 = 210 = the total number of cattle), or in other words, that from the gross 'requirement' (210) claimed against A, a proportionate deduction of 140 must be made for the resource B, leaving the right to be satisfied on A as 70].

[It may not always be easy to determine whether in estimating the requirement of any estate, *any* deduction should be made for other means of satisfying it. In most cases such resources no doubt *would* be equitably taken into consideration. And a *proportionate* deduction (in the sense just explained), rather than the full yield of the other resource, would be preferred on

* This will of course be ascertainable, either by calculating the number of acres that will support one head, or by this as modified by considerations of actual yield of grass and so forth.

grazing and other rights where it is possible. But these are after all matters of detail, and what is of the greatest importance is to see that the amount of need or requirement is fairly fixed, with especial reference to what has been hitherto the practical extent of the *right*, supposing it to have been exercised in a fair and reasonable manner, such as the real necessities of the dominant estate warranted, and the local custom justified].

It is also an important point to determine, in estimating the actual requirement of the right-holder, what date or standard time shall be selected as that for which the requirement is to be noted. For the requirement as it is to-day may be very different from what it was 5 years ago, or 20 years ago. Changes may have taken place in the manner of cultivation and in other local conditions. Must we then look to the amount of the requirement as it (changefully perhaps) exists at present, or at any other given moment of time, or to the need *as it existed at the date when the right originated?*

The Prussian law draws a distinction in this respect between servitudes which are prescriptive and those which originated in grant or contract. In the former, the maxim is *quantum possessum tantum præscriptum* [whatever has been the fixed or average quantity during the period of years which constitutes the term of prescription]. Not so with rights originating in grant or contract, then the requirement of the time being is taken: and if the circumstances have changed, the need may have increased, or expanded (timber for house-building may be required in larger or in less quantity, or in longer or shorter dimensions, owing to change in style of building, &c.) But it is to be understood, that the changes which are allowed to effect the requirement, are natural and legitimate changes, not such as arise from a total alteration in the management and destination of the estate, or in unusual and extraordinary dispositions and arrangements of its working system. [This seems only reasonable, because when a right is created by contract or grant, it is only natural to conclude that the grantor foresaw what was probable according to the usual course of nature, and intended, that if *e. g.*, he granted "building wood for a dwelling house"—it should be such a dwelling house as the custom and style of the time being would necessitate, if otherwise, he could have restricted it. But in the case of a right which has been merely recognized by prescription, no such foresight or intention can be supposed, hence the true measure of the need of the right-holder is only what he actually had during the term when the prescription title was growing].

(*b*). *The yield power of the forest.*

If the yield of the forest is sufficient to satisfy all the properly determined claims of the right-holders, *inclusive* of the wants of the forest owner, then there is nothing more to consider than

the delivery or supply by the quantity fixed by the title, in the case of defined rights, and of that fixed according to the requirements of the right-holder, in the case of undefined rights, as set forth in the preceding paragraphs.

But it may be that the normal yield of the forest when its existing stock is managed on proper principles of permanent management is unequal to the full task. In that case, unless the forest owner has himself wrongfully caused the deficiency, or there is some special title, otherwise the right-holder must submit to a proportionate reduction in the quantity of his produce, [otherwise the right would not be exercised *salvâ substantiâ*—an attack would be made on the capital when a man demanded more than the actual income or interest of it.] Of course no compensation can be asked for such a reduction.

The owner of the forest is never responsible if the insufficiency of the forest yield is due to accident, or "vis major;" as for example, to damage from wind, snow, insects or forest fires; and of course also not when the deficiency has been caused by the exercise of forest rights, through the increase of their quantity or the demand made on the forest by them.

But if the forest owner has wrongfully brought about the deficiency, the forest right-holder can claim compensation: as for example, in the case of over-cutting, or neglect of reproduction, wasting or uprooting the forest or general mismanagement.*

The owner is also responsible if he creates new forest rights, to the prejudice of the older right-holders, or injures the rights by an improper change in the management of the state, (*e. g.*, changing forest into agricultural land.)

Should the owner be bound by any express title to find the right-holder a fixed quantity of material under all circumstances, then he is responsible, because he has chosen to make himself so by the terms of the title. The Prussian law courts have laid it down (as is also expressed in Art. 65 of the French Forest Code) that the right is not an *absolute* one, to a fixed quantity or to a quantity definable according to the standard of need, but a *relative* right, dependent, *i.e.*, on the capability of the forest, with reference to the principles of regular and scientific forest management.

The Bavarian law of 1852 (Art. 25) contains express provisions that when forest rights interfere with a permanent regular management, the owner can claim a definite moderation (or regulation) of them for a given time, without any compensation; provided of course, that the necessity for such action does not arise from his own faulty management.

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* This latter has been expressly recognized by the Prussian "Obertribunal," (including a wrongful neglect to cultivate the forest) as a ground for complaint on the part of the right-holder.

One point remains, namely, when several forest rights of the same kind exist concurrently and the rights have to be reduced, whether all are to be reduced equally, or not, and if not, on what principle one or other is to have the preference.

The correct principle seems to be that rights having the same date of origin, whether prescriptive or arising out of contract or grant, whether defined or undefined, are on the same footing, and must be reduced equally.

But if their date of origin is different,—some earlier, some later,—then we have to consider whether the failure in the capability of the forest arose after or before the date of origin of any of them :

(1), it may go back to a period before any of the rights originated ;

(2), it may be after the older rights and in consequence of the new ones coming in to burden the estate ;

(3), it may be after the older rights arose and before the new ones, but not *in consequence* of the demands arising from the latter.

In the (1) case, all rights will be reduced or regulated equally : in the (2) the new rights alone will be reduced : and in the (3) the new ones go first altogether,* and the older ones only when a further reduction is still necessary.

(*c*). *The concurrent right of the owner to use the forest along with the right-holders* ('*mitnutzungsrecht*').

The German laws recognize as a principle resulting from the nature of ownership and of the servitude, that that the owner has always a concurrent right of enjoyment along with the right-holder, unless the latter has acquired some very special and express title to exclude him.

No doubt can, indeed, exist about this in case the produce of the forest estate is sufficient. But if it is deficient ; then the laws of different countries deal differently, and even in contradiction one to another, with the question.

A general comparison of the laws, taking also into consideration generally admitted legal principles, tends to the following conclusions :—

(*a*). *Cases where the right-holder has the preference.*—This is admitted in the case of original or ancient (*ursprünglich*) real servitudes, defined as to their extent and mode of exercise,† when there has been any fault of the owner tending to produce the deficiency, even undefined rights have the preference, (such as, excessive working by the owner, creation of new rights, ill-considered changes in the management, &c.)

* Except indeed when the new ones are by prescription, and the prescription has run as well against the older right-holders as against the owner.

† And not those of ancient origin, but undefined, and only in later times fixed and made definite.

(*b*). *Cases where the owner has the preference.*—It must be remembered, that in order to secure the permanent satisfaction of forest rights, as well as to keep up the forest itself, it is indispensable to protect, manage, work and cultivate, the forest in a proper manner; and this costs money: the produce of the forest, of all kinds, is the natural source, whenever this expense can be met. It is, therefore, not unreasonable that the forest produce available to satisfy rights, should meet this expense, at least in so far as the rest of the produce is inadequate to do so. (Of course, it is assumed that the inadequacy is not due to the forest owner's own fault). It follows for instance, that when forest officials have to be paid or found in certain quantities of forest produce, in return for their services in the forest, that this payment should come from both right-holders and owners, since both are benefitted by it. The forest owner may therefore satisfy such demands out of the forest produce before any one else of the right-holders can get his dues.

(*c*). *Cases where the right-holder and the owner have equal claim to the produce.*—Where there are original undefined rights, (even though they may have subsequently become defined,) the right-holder has an equal but not a superior right to share the produce with the owner, according to the wants* of each.

[The reason of this distinction between originally defined and originally undefined rights seems clear. When in ancient times, a defined and fixed right was granted, it was clearly the intention of the owner to suffer the right independently of his own satisfaction, either he knew that the forest would suffice for both, or he deliberately chose to grant the fixed quantity unconditionally, and without reservation for his own convenience.

[Where, however, the right merely grew up in an undefined way, on sufferance, and without special grant, no intention of the owner to exclude his own natural enjoyment can be inferred].

If the produce is insufficient, both parties suffer an equal diminution.

These principles are not always admitted, and some authors controvert them, *e. g.*, Von Bangerow Lehrbuch der Pandecten, (§ 340, Anm., 2, 4), 7 Auflege, 1863. Windscheid also, § 209, pages 296-9.

(*d*). *The duty of the right-holder to care for or to spare the forest* (*'waldschonpflicht'*).

Besides the restriction of rights to the wants of the right-holder, to the capabilities of the forest and with reference to a (possible) concurrent right of enjoyment residing in the forest

* Wants, *i. e*, after accounting for other means of partially satisfying it, which either may possess.

owner, the duty of the right-holder to enjoy his rights without destroying the forest, is always to be enforced, by regulations in respect of locality, season, and manner of exercise.

* This follows from the nature of a forest right, which is one of using the produce, but not extending to the substance of the servient* estate.

Such a principle is well expressed in Art. 80 of Theil I., Tit. 22, of the Prussian Landrecht, which runs as follows :—

"Whoever has the right to keep (*hüten*) his cattle on the soil of another, must make use of that soil so that the owner of it, suffers no damage in the substance of his estate, and so that he is not hindered in the usual cultivation and utilization of the land according to its nature."

And in §241 :—

"The right to dig earth, stone, or clay, &c., on another person's ground must always be so exercised that cultivated fields, grass meadows, pens and folds and trees, suffer no injury thereby."

In case of all wood-rights, these depend on the continued existence in a capable state, of the forest, for otherwise there would be no *perpetua causa* for the right, which the received principle recognizes as necessary in the case of a servitude. It is then obvious that the wood right can only be so exercised as not to interfere with the regular and continuous yield of the forest. An uncontrolled, irregular, and uncertain cutting by right-holders would certainly result in the deterioration and ultimate loss of the forest itself.

It is true that the case stands otherwise with rights to grazing, to grass, and to collecting herbage under the trees, for these are likely in many cases to increase, the fewer trees there are. [But still the right-holder must spare the estate ; he cannot separate the parts and say he will take care of the soil-substance, but has no business to care for the trees—for the forest is one whole—soil and trees ; one cannot be taken apart from the other]. All laws, however, expressly provide that rights of this class must be so exercised as not to interfere with the management of the estate as a whole. Nor can the grazing-right-holder, for instance, say—'there was only such and such a stock on the ground when my right originated, you cannot improve your forest and increase the stock.' Because the continuous filling up of blanks and restoration and improvement of a forest till it reaches the best possible condition, *proper to a forest of that kind and class*, is naturally part of a good and reasonable management of every forest estate, and this cannot be hindered.

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* [Even a turf cutting right, or a right of digging gravel, is such, though in strict theory it involves a diminution of the actual soil mass. But in practice turf forms again, and is therefore much more analogous to produce and even gravel, though not reproduced, does not practically injure the estate : no one could have a right to take such large quantities of gravel or soil as to convert the removal of the forest into a great pit].

The Prussian Landrecht specially provides that where a right can be exercised, equally well for the right-holder in more ways than one, that way is to be selected which is least burdensome or least to the detriment of the servient estate.

The extent of the restriction which is imposed on the right-holder, for the safety of the forest, is expressed in the regulation, as regards *locality, season, and manner of exercising* each right. In order to facilitate the protection of the estate, certain rights may be restricted in their exercise to particular seasons or even to certain fixed days.

All these matters are provided for in special laws.

[I do not go into detail in this part of the paper, as there is nothing new ; and what is mentioned will be already found in my Handbook of Forest Jurisprudence].

(e). The owner's right of working his forest.

In the same legal principle as that which compels the right-holder to spare the forest, the forest owner has the right to have his forest worked always in a proper scientific manner, this right is only limited by the necessity of providing for the due exercise of the existing rights.

The owner's right consists in freedom to do—

(1), all acts of ownership that do not touch the servitude right in any way at all ;

(2), acts which do affect the right to some extent, but are requisite to maintain the forest itself (*Wald-substanz*), or to accomplish the natural purpose and destination of the forest, or are demanded by the rules of a regular forest working : also any acts or practices which are usual in the locality where the forest is situate ; or measures which were being taken (according to the state of the forest) at the time when the rights originated.*

This submission of the right-holder, follows from the definition of a right, that the owner has the totality of rights in his estate except only in so far as the right of the servitude holder to his own enjoyment, limits him. A servitude takes away from the owner, no capability, or faculty of action except that which would interfere with the enjoyment of the servitude.

The right of the servitude holder to have the forest (the substance of the estate) maintained so as to serve his purpose corresponds to the right which the owner has, on his side, to keep his forest in a good condition. The 'substance' of the forest, consists, as we have said, of the soil, and the surface growth ; and as parts of the surface growth must be considered, all arrangements and groupings of the growing stock, the age

* Unless of course there was an express title granted with the right, or become prescriptive afterwards to forbid any particular act on the part of the owner.

classes, &c., which result from the method of working the forest and its arrangement on a periodic plan of cutting with reference to its reproduction in a given term of years. Part of the right to maintain the forest is the right to maintain it in a condition to fulfil effectively and completely its normal, natural and proper purpose. The natural purpose of a forest is the abundant production of wood: the existing state of the forest may not be such as to fulfil this object; and in such case the right-holders must submit to restrictions necessitated by such changes in the forest as will tend to secure the establishment of the desired conditions.

This is expressly provided for in the Bavarian law.* It follows that if the 'substance' of the forest is to be maintained, and that in such degree that a complete wood-production (as the normal object of a forest estate) can be satisfactorily attained, the owner must have the right, and the right-holder be bound to submit to a *regulated forest-working scheme* or *system*. For under the head of "the maintenance of the forest" come the arrangements necessary for securing a continuous supply of wood fit to cut; the continuous reproduction of wood in place of that cut and carried away, the protection of the estate against injury from wind and weather, by means of a fixed method in, and direction of, the lines of felling: and under the head of "fulfilling the normal purpose of the forest estate" come, the utilization of the wood before it rots or deteriorates, the filling up of blanks, and the selection of different kinds of trees, adapted to flourish in the different parts of the forest, according to their soil, exposure, and so forth.

All these matters together constitute the aim and object of a regulated *forest-working system*.

All the chief laws, therefore, contain provisions† that the exercise of forest-rights can never interfere with a properly regulated system of forest working. In all cases the forest right-holder has no claim to compensation, unless indeed the necessity for any measures, which specially restrict his right, has directly arisen from the neglect or wrong doing of the forest owner.

The *standard of forest management*—the standard condition of forest, which the owner is entitled to attain to, and for the attainment of which the exercise of forest rights has to be regulated, is the condition of the forest (according to the custom of the locality thereof) which existed at the time of the origin of the forest servitudes.

* This law also provides that if the right-holder thinks the changes and other operations undertaken by the owner, are going too far, or are more than his right of due maintenance warrants; application may be made to the forest authorities who are to determine the question, and determine what, if any, compensation is to be given to the right-holder.

† *Cfr.*, for example, the precise terms of Art. 24 of the Bavarian law of 1852.

It is obvious, for instance, that if a deciduous coppice with sparse standards and with much space for pasture, were converted (according to a method of treatment since become general in any locality) into a coniferous high forest, the grazing right would become almost worthless. And so might a forest of beech firewood growth be converted, to the destruction of the rights of pawnage (feeding pigs on the beech-mast). But such changes of the forest to something *quite different to what it originally was* (at the time of the origin of the right) would be to ignore both the inherent constituents of the right, and also the legal principles, which we have already noticed, and which are that the owner must abstain from acts, which interfere with, or nullify, the enjoyment of the right; and that all acts of the owner, other than those of the usual cultural kind, are only admissible when they do not diminish the just enjoyment of the right-holder.

It is only fair then to consider the original character of the forest, as a standard, and allow the owner to maintain and to improve within those lines; but not to change and entirely alter the sort of forest, so as to harass the right-holders.

The parts or elements of a *system of working*, which may each demand a few words of special notice, are the following:—

(*a*). *Laying down of a working-scheme to be systematically followed out in the future.*—The condition of the tree growth, and the production of the material of the forest is secured by this.

In every working-scheme, both time and place, method, aim, and purpose of working, are laid down, and the limits of the possible annual yield are fixed; and thus obviously, the safety of the 'substance' of the forest and the fulfilment of its natural purpose and destination. are alike secured.

Wherever such a scheme, duly considered, of necessity, touches the enjoyment of a right in quantity, extent, or in its locality, the right of user, must—to the requisite degree—give way.

If there has not been hitherto a regular working system introduced, the forest owner can at any time introduce one.*

[It should be borne in mind that it is generally, if not always, possible to arrange a working scheme with special reference to rights of user, provided of course that those rights are not so excessive, that it becomes impossible to provide the quantity of wood, &c., they demand without exceeding the regulated yield of the forest, or without having such an area open to grazing as would make it impossible to keep the requisite proportion of the area under young growth and seedlings, &c.]

(*b*). *Right to cut the wood.*—The successive production of

* See this laid down in the Prussian Landrecht, Tit 22, Part I., Art 171 And the new order must of course be arranged so as to provide for existing grazing rights, as far as possible

wood to be cut and removed and the cutting of the same, is part of the 'natural destination' of every forest, and is the aim and end of every well considered working-scheme. No right-holder can, therefore, prevent this. The utilization of the wood of course implies the removal of all that comes to maturity [materially, that is, for its special object and designation, as firewood, hop-poles, building wood, &c.], and before it begins to deteriorate, spoil, or lose value.

The right-holder, who likes to see all beech-mast*-bearing trees (for example) left to stand, cannot object to such necessary cutting. Nor is the forest owner bound to leave old stems to decay and fall or break off; or stems that ought to be thinned out, to wither and die; in order that the right-holder to dead and fallen wood may have something to fill his sacks with.

Rights to dead wood and fallen stems, are after all essentially gratuitous rights, and are dependent on the *casual existence* of *such wood;* and no forest owner can be compelled to work his forest so badly as to secure the existence of a quantity of it. The holder of such a right must have known all along, that where there is not a great excess of forest production,—which makes care and regulated working of the whole impossible or unnecessary,—the forest owner, if he works his forest in a reasonable manner, can almost entirely obviate the existence of decaying and falling stems and branches.

When such rights are formally extinguished by process of law, it is a question of the precise origin and circumstances of the right and the actual facts of its exercise whether any compensation is due, or whether the forest owner would be forced at least to find a certain quantity of cut standing firewood in lieu of it,† or himself to cut and deliver the dead stems found in a thinning or "forest cleaning."

(*c*). *Right to secure reproduction.*—The forest right-holder must submit to such restrictions as are imposed by the necessity of reproducing an area cut over, and also of planting up the blanks in a forest‡ (in the absence at least of a special title otherwise). This planting up can always be done gradually, and with respect to the requirements of the grazing rights.

(*d*). *Right to protect the forest.*—This right finds illustration in the provisions which special laws contain to prevent the destruction of the forest soil by the exercise of the right of raking up the humus, &c.; or those for closing areas covered with young growth against grazing rights, and such like.

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* Thus Art 176 of the Part I, Tit 22, Prussian Landrecht—

"The holder of a right to beech-mast, cannot object to the owner, and other wood-right-holders, cutting trees that produce the mast, when such cutting is according to the rules of forest working" (*forstmassig*). This means that every thing may be cut, because it is mature, or to prevent deterioration, or to secure the development of standing growth, or the reproduction of the forest.

† See on this subject, Eding, page 133 Also Pfeil, page 108

‡ As expressly decided by the Prussian Obertribunal in December 1857.

(*e*). *Right to 'locate' the user or assign its exercise on certain specified portions of the forest.*—Rights are regulated as to their place, season, and time of exercise, and various special laws* are to be found which require that no right-holder should exercise his right without notice to the owner, so that he can be supervised ; or that certain days are fixed, or areas determined for the exercise of certain produce rights.

It often happens that by the original title, or by the nature and circumstances of the right itself, the exercise is necessarily confined to a certain place ; then of course that has to be attended to ; but even so the French law (Code Civil, Art. 701) goes so far as to allow the forest owner, to assign a different place for the exercise, provided that the right can still be exercised to the holder's reasonable convenience, and that changed circumstances have rendered the right as originally located unduly burdensome to the forest owner, or a real hindrance to rational improvement.

Section II.

The limit of the forest owner's right with reference to forest servitudes.

Servitudes, as we have seen, entail certain limitations in the exercise of the right of ownership of the servient estate. These limitations consist in the obligation, to *suffer* or *permit* something, to *forego* some action, and even (exceptionally) to *do* something. The owner must *suffer* or permit the due exercise of the right. The limits of a due exercise of a right of user were considered in Section I. The owner must *forego* such acts as would prejudice the reasonable enjoyment of the right. Such acts may be in the course of *forest working*, or in the course of a *concurrent enjoyment* of the forest yield along with the right-holder. And we shall ascertain the limits of the owner's right by giving a proper answer to the question—What sort of acts must the owner pretermit, in order to avoid any illegal trespass on the province of the right-holder ? As to the exceptional obligation of the forest owner to do something for the right-holder, that, as we have seen, consists solely in his being bound to *maintain the forest*, as the *perpetua causa*, or permanent source of satisfying or supplying the right.

We have then to consider the limitation of the owner's right under the three heads—(1), of the right of working and management ; (2), of the owner's concurrent enjoyment along with the right-holder (*mitnutzung*); and (3), of the duty of maintaining a forest in a condition capable of satisfying the right.

1. *Limitation of the right of working and management.*—Within the meaning of forest working and management are all

* Compare, for instance, Arts 79, 112, 120 of the French Forest Code.

measures, having for their object, the utilization of the forest, and getting therefrom its due yield of produce, namely, the devising of working-schemes, the regulation of the yield, the disposition of species of tree determining the method of management, fixing the period of rotation, establishment, in a particular form, or disposition of the growing stock, cultural and growth-treatment (thinning, pruning, irrigating, &c.), protection of the forest, and also utilizing and converting into money the various products of the forest. A perfectly unfettered forest management, would in all these matters, have an unrestrained action on every part of the "substance" of the forest. Not so a forest management burdened with rights. Such a forest can only be managed and worked within certain limits, which we have now to define. Inside this line of limitation are the measures which are within the owner's legitimate "management-right;" outside it, are acts of management which are inadmissible and must be foregone.

Generally, as we have already seen, the right of management *includes* all measures which do not really interfere with the servitude, or even if they do, to some extent interfere with or diminish it, are still admissible, because they do not involve any change in the character of the estate, or the method of its management as there existed when the right originated, or because they are absolutely indispensable to the maintenance of the forest as such, and necessary to enable its natural purpose and destination to be attained.

For instance, a forest owner would be entitled to cut out his wood and thin his forest, according to a reasonable and recognized, workmanlike method, even though by so doing he should much diminish the quantity of dead stems and rotten wood, which a holder of the right to fallen and dead wood might otherwise obtain.*

Taking now the other side of the question, the owner's right of management, with respect to opposing rights of user, does *not extend* to, or *excludes*, such measures of management and cultivation, in themselves prejudicial to the servitude, as involve changes in the original† character *(bestandsart)* and method of management of the forest—such changes not being *indispensable* to the maintenance of the forest, or to its continued utility, or to its reasonable, workmanlike, management, but being merely *desirable*, with a view of enhancing the forest yield or furthering certain special objects and ambitions of the owner's.

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* The only claim to compensation in such a case would be one we need hardly take any practical cognizance of, (but which is conceivable,) only when a special contract, or its equivalent, had led a right-holder to suppose a permanent supply of a certain quantity of dead wood, &c.

† By 'original,' is here meant, the class, style, and condition of the forest as it was at the time when the right of user originated.

All this follows from the nature of a right, when it is remembered, that permanence or durability is an essential element. The dominant estate has a permanent, regular, need or requirement or advantage to be claimed; the servient estate a permanent working condition, capable of satisfying that need, or yielding the advantage. The owner cannot, therefore, arbitrarily introduce a new character and form of management, still less, a change in the very nature of his estate, such as would render it no longer possible to satisfy in any reasonable manner the just demands of the right-holder.* He can only make changes when they are demanded by the actual maintenance, not the mere improvement, of the forest,† or by the requirements of a reasonable working (as when a forest has been heretofore worked at haphazard without a serial system of felling compartments, and so forth, and these are now introduced), or in order to enable the forest to fulfil its natural and proper destination.

Eding‡ has also considered that in a forest subject to rights of pawnage (acorns or beech-mast) an owner could not introduce new methods of cultivation, *merely* to get a larger income from his forest, to the prejudice of the right-holders.

Various modern laws have enacted special provisions as to the remedy which the right-holder has in case the owner oversteps his legitimate action in dealing with the estate. Such remedies may consist in either a compulsory restoration of the *status quo ante*, or of giving compensation in money, or in kind, as where (under the Prussian Landrecht) a forest owner who has taken such steps to remove all dead and fallen wood, that right-holders entitled to those materials can get none, is compelled to furnish an equivalent supply of cut standing wood, if that is possible, and if not to pay in money.

The excess on the owner's part is likely to happen—(1), through clearing of the forest and converting it to arable or building land; (2), wasteful working without care for reproduction; (3), changing the species; (4), changing the method

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* Nor could he do so even though such a change had become very general in other unburdened estates, owing to a general progress in economic knowledge, or a general change in the demands of the market. Only would it be admissible, in the conceivable but not practically likely case, when an old standing form of forest had become absolutely valueless, and when a change to some other kind of forest growth is really indispensable.

† [But the term "mere improvement" requires to be guarded carefully, especially for Indian Students. It is possible to *improve* almost any forest, even though it is in a presently satisfactory condition and under orderly management: and it is to such cases that our author refers. We must not understand that rights can stand in the way of "improvement" of a kind which consists in substituting a well-grown stock for a badly grown one, a methodical management for a haphazard one, and so forth]

‡ Eding, page 98.

of felling, &c., (5), shortening the term of rotation; (6), measures for cultural treatment of the growing stock.

The laws of many European States provide in some cases for prohibiting the *clearing of forests*, on the part of the owner.

Changes in the forest species, e. g., an oak or beech forest into a coniferous forest (to the prejudice of pawnage-rights) or introducing beech and spruce, in the place of oaks or Scotch fir, to the prejudice of grazing rights, are not allowed. Unless indeed they are unavoidable and without any fault of the forest owner: as when a soil has lost fertility or its former degree of moisture, or has become impoverished by the exercise of *streu* rights, so that it can no longer properly support a growth of the original species.

Such changes are not admissible merely in order to increase the value of the produce; and it would seem that the right-holder would have to be compensated, even where the change was consistent with good forestry—though not absolutely essential; for example, an existing beech-fuel forest may become almost valueless, owing to the neighbouring cheap production of coal: here it would be most advantageous to convert it into a coniferous forest. No doubt the forest owner could in such a case demand to be allowed to buy out the right, or to furnish some equivalent for it; but still in principle the respect for the existence of the right, even under these rather extreme circumstances, is recognized.

Changes in the mode of working, may affect rights very much. A change from regular compartment felling to selection felling implies, a general admixture of ages all over the forest and consequent carrying out of cuttings over the whole area, and the springing up of young growth, which may be inconvenient for grazing. A change from high forest to coppice, may almost destroy rights of pawnage and rights to *streu*. Such changes would not be permissible, unless indeed, owing to former neglect, some method of cutting had been hitherto allowed, which was, in the particular locality, &c., contrary to forest principles, and the necessities of a reasonable forest management demanded the change.

Some decisions of the Courts had gone so far as to allow the right-holder no power of objecting, when the owner adopted a management which prejudiced his right, but which recognized as a desirable *(zweckmässig)* one by the principles of forest science; but such decisions go too far, and the more just conclusion seems to be, that the owner may always do what is really *necessary* for a good and proper working of his forest, or may substitute a regular working for a hitherto irregular one: but he cannot adopt any and every measure, which is merely '*desirable*' or 'highly profitable' according to an advanced standard of forest working, to the prejudice of right-holders.

Shortening of the rotation.—This may be in some cases desir-

able, but as it never comes within the scope of an absolute *necessity* for proper regular working, it can never be attempted without compensation to the right-holder.

Measures for the promotion of growth (thinning, pruning, cutting to let in light, &c.) Whether they are admissible or not, if they tend to diminish or nullify rights of user, depends on whether they are really indispensable for a proper management, or whether they *can* be dispensed with, or carried out gradually or in a modified manner. The question of thinning presents some difficulty, because, a forest *can* do without thinning: nature will kill off the suppressed and over-crowded stems, and thinning after all only assists and expedites the processes of nature. It would appear then that while a forest owner cannot be asked altogether to forego thinnings, he can be required to regulate them so as to leave something for the right-holder to dry stems.* [A distinction may in practice be drawn between thinnings that are fairly classed as *necessary*, and those which can only be called *desirable*].

The same principle may be applied in the case of prunings of living branches, which may be so effected as entirely to remove all chance of a right-holder finding any dead branches or fallen wood.

2. *Limitation of the owner's right of concurrent enjoyment along with the right of user.*—The owner has, as we have seen, not only his obvious claim to the surplus, which remains after the right is satisfied, but also, when the produce is not more than sufficient he can claim, to *deduct first* what must go to pay for the control and supervision of the forest, and in the case of indefinitely granted rights can claim a *concurrent* enjoyment along with those rights. When the right is *ab origine*, defined, and the produce is not more than sufficient, then it takes precedence of the owner's concurrent use. The owner must not create new rights to the prejudice of those already in existence.

The owner may have a concurrent right of grazing his own cattle along with those of the right-holder, but would not be allowed to cut the grass for his own use.

[The author here has a number of paragraphs regarding rights to dead wood lying (*Lexholz*) and to the leavings after fellings (*Abraum*) in certain cases. As the former right is both rare and unimportant in India, and the latter unknown, it would serve no useful purpose to reproduce the remarks at pages 134-136 of the original].

3. *Duty of the owner to maintain his forest.*—According to the legal notion of a servitude, the limitation which such a right imposes on the holder of the servient estate consists only in this, that the owner must *suffer* the right-holder to use the estate for

* *Cfr.* Roth., § 284, page 283.

the purposes of his right: and he must forego all such acts as interfere with, or diminish, or nullify the right. On the other hand, a right of user does not (ordinarily) require the estate-owner (actively) *to do* anything in the interest of the right. (*Servitus in faciendo consistere neguit*). This principle admits of one exception, to this extent that in some cases the very nature of the right or servitude requires the owner *to maintain* the servient property in a condition fit to serve the purpose of the right-holder. In this case with the right *in rem*, is mingled a certain element of personal obligation on the estate owner, *viz.*, the obligation to maintain. The Roman law already recognized this in the servitude *oneris ferendi*, as when the owner of a (servient) wall or pillar was found to give its support to an adjoining (dominant) building, here the servient owner might be bound (actively) to keep the wall or pillar in a sound and support-giving condition.

This principle has been adopted into various modern laws, in some cases the owner bearing the entire burden, in others, sharing it with the right-holder. The cases of right created by contract for a consideration, where the servient property is not in a condition to support the right, the owner alone is bound to restore it, unless indeed the cause of the failure is accident or *vis major* (beyond the control of the owner). And so where a right of way has been conceded by agreement, the owner of the soil may have to maintain the roadway in a suitable condition.

In cases where the right-holder is bound to contribute, it is always where both he and the owner, have the right to enjoy together, the same thing; or where the damage to be repaired has been caused by accident or *vis major*, and is equitably no more to fall on the owner than on the right-holder, but should be shared by both.

In the case of forest rights, however, the principle of sharing a contribution on the right-holder's part, has no application; only that of the owner's duty of maintenance is in question. The duty of maintenance is different according to the nature and object of the forest right. In this respect it is important to distinguish between rights which affect the forest soil and those which touch only the upper growth, *viz.*, the stock of trees. In those which affect the soil, such as grazing rights, turf cutting, grass cutting, heather cutting, &c., the condition of the tree growth is generally of no importance; indeed, the less well stocked the forest is, the larger will be the amount of available material.

But the forest owner is in no way bound to keep his forest in an ill-stocked and semi-productive condition merely to benefit the grass rights, &c.

[This, it should be observed, is true when the whole area is forest, and would naturally—as forest—be equally well stocked;

but cases are conceivable, where rights might exist in such a manner, that the estate owner would be bound to maintain a form of management in which the surface is partly devoted to trees and partly to turf for grazing as the principal object of each part].

The right of user is here subordinate to the right to maintain the estate in proper working order for the purpose of fulfilling its primary function. Only the owner must, as we have seen, pretermit all such changes in the method of management hitherto followed, as are not in themselves necessary to the proper working, and would interfere with the enjoyment of the right. But it is always deemed within the necessary scope of a proper management, or of an admissible change or improvement in management, to *effect a complete stocking* of the forest area. Nor is the forest owner bound to undertake active operations to maintain or improve the soil production required for the right (we are now speaking of soil rights as distinct from those affecting the tree growth). No duty of maintenance, *in this sense*, exists, even though the right be one created by contract or the forest owner had a concurrent right of enjoyment along with the right-holder. The right-holder can only claim to practice and enjoy his right, while the owner passively submits to it, and carries on his proper forest management without undue interference therewith.

But there are rights which affect, not directly the soil of the forest, but the tree growth, and here the owner's duty of maintenance presents a different aspect. The principal rights of this class are rights to wood (firewood, building wood, &c.), to resin, to fruits, (as beech-mast, acorns, &c.), or to *humus* and dead leaves (*streu*). If the growing stock were not maintained, there could be actually no exercise of such rights, at all. Maintenance of the forest on the part of the owner is here, a naturally as well as a juristically, essential concomitant of the right. Without a permanent growing stock the *perpetua causa* of the servitude would be wanting.

The maintenance of the forest is then, in all cases, the owner's duty; no matter whether the right is acquired by prescription or by grant, or whether the owner makes use of his concurrent right of enjoyment or not.

This duty consists in abstaining from acts which would nullify the right, and prohibits all wasteful working or "forest devastation," *i. e.*, wholesale cutting without provision for reproduction and restoration.*

The fellings must be so arranged as to leave the requisite stock of a kind suited to the right-holder's requirements, as far as this is possible consistently with the principles of management.

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* Compare Edlng, page 75.

In some European laws, a forest owner who should neglect his duty in this respect, and should thus cause a right-holder to be deprived of his supply of wood, &c., would be bound to compensate him.

But the preservation of an available stock of material, does not extend to any obligation to keep standing over-mature trees, or decayed stems, or those which would spoil if left standing; not even when such material is the subject of a right (*e. g.*, right to fallen wood, &c.)

In the Prussian and Austrian law, a right-holder may claim to have the yield of the forest properly regulated by a working scheme,—which includes of course measures for ascertaining and fixing the proper possible yield of the forest, and dividing the area into proper groups for successional cutting.

Lastly, an indispensable part of the duty of forest maintenance is provision for the due reproduction and restoration of the forest.*

This is recognized *both* by the laws and by the decision of the Courts. A continuous neglect of proper measures of reproduction would ultimately bring about a wood-famine, and would thus put an end to rights of user altogether.

THE LATE FRANKLIN B. HOUGH.

Dr. Franklin B. Hough, the enthusiastic advocate of Forest Conservancy in the United States of North America, died at his home in Lowville, New York, on 11th June, 1885. He was born in 1822 at Martinsburg in Lewis county, studied medicine, and from 1848 to 1852 practised his profession in the village of Somerville, New York. In 1852 he removed to Lowville, and since then his time has almost wholly been occupied in literary, historical and statistical work. His first publication was a catalogue of the plants of Lewis county, printed in 1847. In 1853 he published a history of St. Lawrence and Franklin counties, in 1854 the history of Jefferson county, and in 1856 the history of Lewis county. Dr. Hough is regarded as the pioneer historian of counties in New York State. About this time he began his statistical work, as the Superintendent of the State Census of 1855, the first complete census taken of the New York State. He was also the Superintendent of Census in 1865, and was charged with the duty of making the preparations for the census of 1875. In 1861 he commenced the annual publication known as the New York Civil List, and in 1872 he published the Gazetteer of New York. While engaged on these works, he was constantly occupied with re-

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* *Cfr* 232 §, Tit. 22, Th I. of the Prussian Landrecht, where the right-holder entitled to a fixed quantity of a given kind of wood can insist on the forest-owner's maintaining the supply by replanting, &c.

searches on a variety of historical and statistical subjects. The greatest literary undertaking of his life was the digest of the legislative history of New York State, which contains a concise summary of legislative action upon every topic of public interest since the foundation of the State. This work has not yet been published.

In 1872 we find his name as one of seven Commissioners of Parks for the State of New York. Around the head waters of the Hudson river in Northern New York is an elevated plateau, interspersed with swamps and lakes, on the eastern part rising into lofty mountains. This region, which is generally known as the Adirondack wilderness, is surrounded by open, well cultivated districts, but it has itself proved incapable of agricultural improvement, being generally frosty and barren. Within the memory of man this region was an unbroken forest. Much of the timber worth taking has been got out; fires have done immense injuries, and great tanneries have used up much of the hemlock bark, (*Tsuga canadensis*,) the wood being left to rot or burn. The waters from these mountains afford valuable hydraulic power, and are taken from its south-western part for feeding the Erie Canal, which could scarcely be kept navigable in summer but for this source of supply.

The clearings, and especially the fires, told heavily upon the flow of waters, the Hudson above tide waters had become a brook, and the canals of New York State could scarcely be kept full in summer. These considerations, though they were not at that time generally realized, led to the passing of a State Act in 1872 for the appointment of Commissioners of Parks for the State of New York. The act named seven persons, citizens of the State, who were directed to enquire into the expediency of providing for vesting in the State the title to the timbered regions lying in certain counties, and converting the same into a public park, such Commission to continue two years and to report to the legislature. The Commission reported in 1873, but no action was taken at that time.

In 1876 an Act was passed by the United States Legislature, requiring the Commissioner of Agriculture to appoint a man of approved attainments and practically well acquainted with the methods of statistical enquiry, to report upon the forest question in the United States. Since 1873 Dr. Hough had been engaged in efforts to awaken an interest in behalf of forestry with Congress, and it is believed that to some extent the passing of this Act was due to his influence. To a great extent it was also due to the exertions of Karl Schurz, a native of Rhenish Prussia, who, after completing his studies at the University of Bonn, was compelled, by the political troubles of 1848 and 1849, to emigrate to America, where in 1869 he was elected Senator for Missouri in the United States Senate, and having been re-elected in 1875, was appointed Secretary of the Interior

in March 1877. In accordance with the Act mentioned, Dr. Hough was, in August 1876, appointed as Forestry Agent in the Department of Agriculture. Dr. Hough understood one of the main duties required of him to be, to spread correct information on the subject, and he was thus led to undertake a number of publications in which he embodied the result of his enquiries. He published three official reports upon Forestry, the first of which appeared in 1878, while the last was printed in 1883. These reports contain a vast amount of information regarding the forest resources of most States of the Union, as well as of the adjoining States of British North America. They also treat of forests in Europe, and they discuss special questions, such as the injury done by forest fires and the measures for their prevention, the influence of forests upon climate, in regulating surface drainage and moderating inundations, and the system of instruction in forestry in Europe. The third report contains definite recommendations regarding the reservation of timber lands for public purposes.

Under the title of *Elements of Forestry* he published a systematic hand-book of the subject, which has been adopted as a college text-book in several public institutions in the United States. A review of this work appeared in the *Indian Forester* of 1884, page 136, and at the time of his death the author was engaged in revising it for a second edition.

In July 1881 Dr. Hough undertook, under instructions from the Commissioner of Agriculture, a journey through the principal countries of Europe in order to study the management of public forests. An account of a portion of this tour Dr. Hough published in the *American Journal of Forestry* edited by him, a monthly periodical, of which one volume only has appeared (1882-83), as want of support compelled him to discontinue it. This periodical has on several occasions been noticed in these pages, and it may suffice here to draw attention to the account given in it of the American Forestry Congress, which held its first meeting at Cincinnati (Ohio), in April 1882, its second meeting at Montreal in August of the same year, and its third meeting at St. Paul, Minnesota, in August 1883. In the proceedings of this Association Dr. Hough took a prominent part. The same periodical also contains an account of the Ohio State Forestry Association, which was formed in 1883, chiefly through the exertions of the late Dr. John A. Warder, who was its first President. Dr. Hough also interested himself much in the planting of trees in school grounds and a memorandum written by him, in 1883, was widely circulated by the Bureau of Education, together with a pamphlet, entitled "Trees and Tree Planting," by Hon'ble John Peaslee, Superintendent of the public schools of Cincinnati. For the purpose of planting trees in school grounds, along roads, and on lands adjoining, one day in the year is set aside in several of the Western States,

sometimes appointed by law, and at other times designated by other authority or fixed upon by agreement. This day is wholly devoted to the planting of trees, and the Forestry Congress held at St. Paul passed a resolution, recommending the appointment of an arbor day in all States and in the provinces of the dominion of Canada.

From his published writings as well as from the private letters which I had the pleasure of receiving from him at various times, it is clear, that Dr. Hough regarded the problem before him as mainly an educational one. In one of his letters to me (August 1883) he writes: "We must teach the people their opportunities and their duties. Those who have spent their lives in clearing the forests, may be too old to reform, but the younger generations, who are in a few years to become the owners of these lands, are susceptible to instruction, and upon them the hopes of forestry in the future must with me chiefly depend." He did not anticipate that any effective action would be taken by the United States Government. In February 1884, he writes: "I do not see much hope of any thing being done by Congress. No attention is paid to my advice, and I doubt whether a single member of Congress has ever read the recommendations in my report. The only solution I can see to the question is, an awakening of popular interest and a diffusion of intelligence among the people, and especially the owners of land. Already wild broken woodlands among us are worth more than cultivated fields. If the "Yankee" can see a *dollar*, he will make his best effort to get it, and ere long they will begin to learn that dollars can be earned in growing trees as well as grain. As a means for preparing the way for this, I am endeavouring to awaken an interest in the common schools, for the scholars of to-day will be land owners and farmers ten or twenty years hence."

Reservations of forest lands have at different times been made by the United States Government. Soon after the establishment of a Federal Navy was commenced under an Act passed in 1794, the importance of securing a sufficient permanent supply of timber for ship-building was felt, and this led to an Act of 1799, appropriating 200,000 dollars for the purchase of timber or of lands on which timber was growing suitable for the Navy. Live oak (*Quercus virens*) and cedar (*Juniperus virginiana*) were then the woods most valued for ship-building, and after Florida and Louisiana, which contained the most extensive forests of these trees, had become incorporated in the United States, extensive areas of these forests were reserved, and, nominally at least, placed under protection. Thus from 1830 to 1860, 208,824 acres of forest land were reserved in Florida, and 35,628 acres in Mississippi (on the gulf coast), in Louisiana and Alabama. Large tracts have also been reserved as parks, and some of these contain forest. The protection

however of the forest in these parks is nominal. In the Yellowstone Park millions of large trees have been killed by the annual fires, only the charred branchless trunks remaining. Some forest is also contained in the large tracts which have been reserved for the Indian population. But systematic measures for the formation, protection and good management of large State forests have not been taken. From reliable sources, I know that Karl Schurz, while in the United States Senate, made great but ineffectual efforts in this direction.

Dr. Hough fully appreciated the importance of forming extensive State forests; but he was not sanguine in expecting that any large and really useful measures for this object could be carried at the present time. Shortly before his death he was requested by a Joint Committee of the Senate and Assembly of the New York State to present his views on the formation of State forests in that State with especial reference to the Adirondack region, which had already engaged his attention in 1872. In 1884 he had tried to get a hearing on the subject, but was told by the Chairman of the Assembly Committee that they did not want any information. But in a letter of 30th April last he writes: "This year I found everything changed. I was requested by a large Joint Committee to present my views and they listened with profound attention. They made many enquiries and ended in putting all the Bills before them (six or seven in number) into my hands, with the request, that with or without these, I would present such a draft of a law as I thought the State ought to have."

Dr. Hough then set to work and submitted to the Committee a memorandum on the duty of the New York Legislature with reference to its woodlands, accompanied by the draft of an Act to establish a State Forestry Commission, and to define its powers and duties. The Bill was accompanied by an explanatory Appendix. These papers were printed for the Senate, and with the letter already quoted I received a copy. Dr. Hough added: "They appeared pleased with the plan, and requested me to give it to them complete with all the arguments I chose to offer—for preservation in permanent form, and said they would select such parts as appeared of immediate importance and as much as they could carry, leaving the rest to be perfected by future amendments. This was a most unexpected and gratifying token of confidence, and I felt the very great responsibility of the occasion, for there is not now a State in the Union with any Forest Code whatsoever, and this might become the germ of something of wide and permanent value."

On receipt of these papers, I wrote to him fully upon the subject, dwelling upon several points, which I recommended to his attention, and urging as the first step the formation of an efficient staff of professionally trained officers for the management of the public forest lands. When my letter reached him,

he was ill, but commenced dictating a reply, which his son sent me with the news of his death.

Dr. Hough had an iron constitution, which, his family think, might have carried him through to an old age, had he not overworked himself during last winter at Albany in connection with the proposals submitted by him to the New York State Legislature. The Bill did not pass exactly as he had prepared it, but the first step in providing for the good management of the public forests in the State has been taken, and we will hope that steady progress will follow, and that his labors for the cause of forest conservancy in the United States will not have been in vain.

BONN: *20th July, 1885.* D. BRANDIS.

NOTES ON FOREST ADMINISTRATION IN SEVERAL EUROPEAN COUNTRIES.

SOME time ago, I begged Mr. Brandis to ascertain for me to what department of the ministry forest administration pertained in the different countries of Europe, and where and to what extent instruction in agriculture was combined with the teaching of forest science. Mr. Brandis has been good enough to draw up a note on the subject, which I think will be useful to record in the pages of the *Indian Forester*.

B. R.

FRANCE.

Forest administration was formerly under the Ministry of Finance. By a decree of the President of the Republic, of 15th December, 1877, it was transferred to the Ministry of Agriculture and Commerce. This department, which is now styled the Ministry of Agriculture, has ever since dealt with the forest business. There are several Schools of Agriculture; at these, lectures on sylviculture are delivered, and at the Nancy Forest School there is a Professor of Agriculture.

AUSTRIA.

The administration of the Austrian State forests is under the Ministry of Agriculture. The school for those who desire to enter the State Forest Service is combined with the Agricultural College under the designation: *Kaiserliche Hochschule fur Boden cultur in Wien*. This institution has a very strong staff of Professors, among whom are four Professors of Forestry.

Besides this, there are four provincial institutions, two of which are maintained by the State, *viz*, *Die Technische Hochschule, Gratz for Styria*, a Civil Engineering College with one Professor of Forestry, *Lehranstalt fur Forstwirthshaft, Lemberg* for Galicia, attached to the Civil Engineering College, with two Professors of Forestry. The two other forest schools, *Weisswasser in Bohemia* and *Eulenberg*

in Moravia, are private institutions, which are maintained by the large forest proprietors in those provinces.

Prussia.

The administration of State Forests was placed under the Ministry of Finance by Royal Decree of 16th December, 1808, and this arrangement continued until 7th August, 1876, when it was transferred to the Ministry of Agriculture and State Domains. There was a break from 1835 to 1848, during which period the State forests were in charge of the Ministry of the Royal House. Under the existing organization the Oberland forstmeister is in charge of the Forest Branch in the Ministry of Agriculture and State Domains.

The two Prussian Forest Schools of Neustadt Eberswalde and Münden are exclusively intended for forest students. Sylviculture is taught at Poppelsdorf and at the other schools of Agriculture.

Bavaria.

The State forest administration is under the Ministry of Finance. There is a Forest School at Aschaffenburg, and another attached to the University of Munich.

Saxony.

The Ministry of Finance has charge of the State forests. The Forest School at Tharand was formerly united with a School of Agriculture. A few years ago it was decided to attach this institution to the University of Leipzig. There was at the time a talk of moving the forest school also to Leipzig, but it was found more convenient to leave it at Tharand for the present.

Wurtemberg.

The State forests are under the Ministry of Finance. The forest school was formerly at Hohenheim, where it was combined with the school for Agriculture. In 1881 the forest school was attached to the University of Tubingen, while the school for Agriculture continues at Hohenheim.

Bonn:
19th June, 1885.

D. Brandis.

THE MOREL.

It may interest the readers of the *Indian Forester* who are fortunate enough to possess fine palates, to know that the morel (*Morchella esculenta*), an edible fungus which rivals the truffle in delicacy of flavor, is common in Jaunsar, and was found by me in abundance in May last in that portion of the *Dedra* Gád deodar forest belonging to the Keuntul State, which suffered so severely from fire last year. The paharis set great value on it, and eagerly gather all they can find.

The following is the account of this fungus in the *Treasury of Botany*, where a good illustration of the plant is given :—

"Morel is the common name of *Morchella esculenta*, which under a variety of forms, occurs in various parts of the world. It is occasionally plentiful in this country, but the greater part of what is sold by the oilmen comes from Germany. A large quantity is collected in Kashmir. As it dries very readily, and may be kept for some time, it is much used by cooks to flavor gravies. It is also dressed in various ways when fresh, and makes an excellent dish if stuffed with finely minced white meat. When plentiful it may be advantageously employed instead of mushrooms to make ketchup. Morels are particularly fond of burnt soil, and the collection of them is so profitable to the peasants in Germany, that they were formerly in the habit of setting fire to the woods to encourage their growth, till the practice was made punishable by a special law. *M. semilibera* may be known from the common morel by the border being quite free for some distance. It has a bad reputation, and requires, therefore, some caution in its use. The genus *Morchella* is distinguished by a deeply pitted naked head supported on a peduncle. The depressions are sometimes regular, but occasionally they assume the appearance of mere furrows with wrinkles like interstices."

N. HEARLE.

NOTE ON DEODAR FLOWERS AND CONES.

I WATCHED a tree just in front of my house, which I have observed to be a male, that is, it has never borne cones (during the past four years). On the 20th June there was not a sign of catkins, even with a glass, but on 26th June I found them for the first time; so small that the scales were not visible. This may be taken as about the earliest appearance of the male flowers of deodar.

Regarding the cones—they are now 4 inches long and 2½ inches diameter. Can there any longer be doubt that these will ripen in October? If they do, then it is proved that from the first appearance of the cones (20th August, 1884) to the ripening in October 1885, a period of 14 months elapses, and not two years. It has also been observed this year that trees which bore seed in 1884 (last year), have again cones, which should ripen in October next; these trees were specially marked, and seedlings are alive and carefully protected, under them.

KALATOP,
9th August, 1885.

J. C. McD.

NOTE.—We have received two young deodar cones from our contributor, each about ¼ inch long, which he picked on the 20th August at an altitude of 6,500 feet.

JJ. Review.

FORESTRY IN CANADA.

There would seem to be urgent need of forest conservancy in Canada. In the Province of Prince Edward, there are now no forests of any extent remaining; all have disappeared under the axes of settlers and lumbermen. In Manitoba, vast quantities of timber have been cut down, especially for constructing the Canadian Pacific Railway; and very large areas have been laid waste by fire. In Nova Scotia similar conditions prevail. A Government Report issued last year shows that the pine and spruce forests are being rapidly exhausted, and that there is little left of the once considerable stocks of hemlock and birch. A hundred years ago, the forests of Nova Scotia had not been visited by any great fires. The country then was nearly all covered by a soft wood forest, white pine, with spruce and fir in the rocky parts, and hemlock and birch in the more fertile soils. Great care was taken by the Indians and by the early French settlers to make no fires in the summer season. In 1783, however, a large number of refugees and discharged soldiers came into the country. In the following year no rain fell in May and June; fires were kindled by the new settlers, and within a fortnight two-thirds of the province were burnt over. In the forests which still remain no protection or discretion in cutting is ever thought of. Saw-mills are put up wherever there is a stream large enough to turn a wheel, and every tree within reach from 7 inches in diameter and upwards is brought to the mill and cut up, the larger trees into timber, the smaller into shingles, laths, and staves. If matters continue in this way, there will soon be no timber left in the Province. But Nova Scotia is unrivalled for its powers of production and reproduction of timber; and all that is necessary is the enforcement of stringent measures of conservancy and protection. It is to be hoped that the Local Government will take the matter up, as has already been partially done in Quebec, but there are no signs of such action at present. In the Province of Ontario, there are about 18,000 square miles of land known as timber limits, that is, in which lumbermen have purchased the right to cut lumber for a certain period renewable yearly, and on which lumber when cut proportionate dues to Government are paid. Besides this area there remain about 20,000 square miles of

forest land which have not yet been cut. Much damage has already been caused by fires, but the application of proper forest laws will be amply sufficient to ensure to the forests a perpetually reproductive condition, and an annual yield equal to the present yearly outturn. In British Columbia, comparatively little timber has been cut, and the forests are reported to be almost inexhaustible. In the Province of Quebec, there are large areas of Crown Forests, but ever-increasing care is necessary for their preservation, and to ensure a continuance of the annual yield and proper profit to the State.

ARBOR DAY IN AMERICA.—The practice of tree planting by private individuals and associations has been taken up with much energy in the United States, and is likely to result in widespread public benefit. In Ohio, a State Forestry Association, which has been taken as a model for similar associations in other parts of the country, has been organised for the purpose of stimulating and developing public interest in arboriculture. The State Legislature has taken up the matter, and in 1883, a Government proclamation was issued setting apart the fourth Friday in April of every year as a public holiday, to be called Arbor Day, and to be devoted to the systematic planting of trees and groves in all suitable places. These measures have been rendered especially necessary in Ohio, where neglect and destruction of the forests have been allowed to continue for many years. It is intended that the State Forestry Association shall form the centre of forestry associations in every city, town, village and school in the State, whose object shall be to plant trees along streets, by the road sides, in parks and commons, around public buildings, and in waste places; to distribute information respecting trees and forests among the people, and to encourage tree planting in every possible way. The celebration of Arbor Day forms the subject of an interesting pamphlet issued by the Department of the Interior, Washington, in which is to be found much information both practical and historical, and a valuable letter by the late Dr. F. B. Hough.

JJJ. Official Paper.

NOTE ON STRIP FELLINGS FOR SAL COPPICE.

Introduction.—The principal reason for the adoption of the system described in this note, and called by me the "strip system" (from the forests being felled in strips in regular order), is the gradual conversion of sál coppice forests in the plains from a state of ill-conditional pollard or crooked coppice growth, into well grown, straight coppice growth; this is done by cutting over the felled trees flush with the ground, by which, as a rule, strong straight shoots come up from the ground level, and, if properly protected from fires and cattle, the newer growth will give useful material for native buildings and agricultural purposes; the inferior growth, as well as the tops and branches of the felled trees, will supply fuel; whereas under present circumstances the produce is stunted in its growth, and the greater part is unfitted for building and agricultural purposes. The two forests in which I have adopted the system are the Akona forests of the Kapurthala State in Bahraich, and the Pilibhít reserved forests. In the former the bulk of the forests consists of stems which have been cut over about 4 feet from the ground, and when any straight shoot appeared it was cut off; this system having been continued for many years, the stock on the ground is principally composed of gnarled and crooked stems which give but few straight shoots; the diameter of the stems as a rule varies from 4 to 9 inches at one foot from the ground. In Pilibhít the trees were originally cut over badly, and with the combined influences of bad treatment,* fires, frost, and climbers, are principally crooked young shoots (on old roots) which at present are only useful as fuel: it is hoped that much of the re-growth under more favourable circumstances will be of much more value, and yield building material.

As far as I know, felling in narrow strips or belts is only occasionally practised in a few places on the Continent of Europe, and this is for the purpose of obtaining reproduction from seed in "high forests" situated on mountain sides; here narrow strips are cut in a direction at right-angles to the

* It is possible that some of the crookedness of the stems may be attributed to later felled trees falling and damaging young coppice shoots—*see* paragraph 21 (*j*).

direction of the prevailing wind, so as not to let the wind get into the forests and work destruction among the weak, tall, drawn-up stems, which it would if large spaces were felled at once.

I know of no *coppice* forests having been worked on the "strip system" till I experimented in Bhira and Akona.

In Oudh, in making 100 and 50 feet clearings in the past 16 years in "high forests," for block and compartment division lines, I noticed that the growth of seedlings and saplings in the cleared belts, on good and average soil, was much superior to that in the high forests on both sides of the clearings, light being admitted; at the same time for some part of the day, though there is no deleterious "cover," there is partial shade on the clearings, and at the same time the growth on the clearings gets the benefit of the aërial moisture from the adjacent high forest. In poor soil, and where there is much grazing, the reproduction from seed has been poor, and the stools of even young trees have not coppiced, as in these broad strips too much sunshine has been admitted; the bad condition of the soil is also shown by there being no long grass.

In Oudh experience has shown that in coppice forest it is not safe to cut over large areas at once, coppice so treated has done well in places where the growth was strong and the soil rich and damp, but in other places the frost has got in and the re-growth has been cut over every year by it, and it has not recovered itself in eight years or more.

In 1877 I made in the coppice forests of Bhira the experiment recorded in Appendix "A," Oudh Forest Report for 1876-77, Mr. Wilmot conducting the operations. I cut over five acres in one plot, three acres by two acres long, one acre being untouched. (1), two acres (about 210′ × 420′) flush with the ground, cutting over everything; (2), two acres (about 210′ × 420′) flush with the ground, in strips of 20 feet broad, leaving 20 feet of forest standing; (3), in one acre (210′ × 210′) I cut out flush with the ground about half the standing stock, leaving the best poles. In No. 1 the growth came up with promise at first, but the first year of strong frost cut back the shoots, and it has never recovered from frost; it is true that part of the plot was on poor soil, that there is much grass, and that a fire once got in: in No. 2 the shoots have come up straight from the ground, often one good leading shoot, the forest on both sides has drawn them up and protected them from the frost: in No. 3 the growth has not been so good, as the shoots cannot rise so straight owing to overshadowing trees: fires got into these plots as well as in No. 1, but the damage was much less.

Mr. Amery about 1874-75 cut over a large area of sál coppice in the Rámgarh forests, Gorakhpur, over 100 acres in one place; the plot had sál coppice on three sides, and a broad drainage line on the other, beyond which was lofty sál forest.

This area has suffered very much from frost, and part of it was planted up with sissú, which, owing to the high grass which sprung up, did not do well.

On the other hand, I have seen a large area further north in Gorakhpur, where the soil was better, where Mr. Amery made a large clearing about the same time as in Rámgarh: here the trees have come up and do not seem to have been much damaged by frost; but they, as a rule, have a number of shoots from the same stool and are bushy. I have seen other places in Oudh and Gorakhpur where large clear fellings have been made without apparently much damage from frost, but it may have been that the soil in the part cut was rich.* In the Rámgarh block the coppice forest has been extensively thinned all round the clear felling, but frost has not got at the undergrowth, showing that a certain amount of standing stock protects the young undergrowth.

It is a practise among Indian cultivators to sow lines of *arhar* with their cotton, the latter suffering much from the frost; the *arhar*, which is one of the only plants besides castor that stands the same time on the ground as cotton, and which, though it suffers from *extreme* frost itself, has a protecting influence on the shorter and weaker cotton stems under ordinary circumstances.

It seems paradoxical at first that in India the frost should do so much damage to young indigenous undergrowth, whereas it does not in colder countries, where large areas of forest are coppiced at one time; but in the colder countries the plant is suited to the climate; the great cry of European foresters is "that harm is done in uncovering the soil" in what to us Indian foresters is a mild, damp climate; the plants dry up (particularly seedlings), most European forest trees being surface-root feeders, whereas Indian forest trees are for the most part deep-root feeders, and once they have got their roots well down, the hotter the weather the better they grow if the sub-soil be damp as it usually is; they, too, are suited to the climate they have to live in. In a state of nature the seedlings of gregarious forest trees, as sál, would have some protection from the parent trees till they could exist independently; and in the same way where young stems are damaged, the re-growth would have the protection of the surrounding trees.

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* This is shown particularly in the south Balapur Forest of Akona which was cut over for cultivation much lower than usual, and is now a fine grown straight coppice forest, but here the soil is good, wheat still growing on the land reclaimed from the forest over 12 years ago; in other parts of Akona land that had been reclaimed from the sál forest has lapsed into jungle. As a rule sál forests are on poor sandy soil; if the soil had been fitted for agriculture, the chances are there would have been less sál forest than there is When I speak of the *dampness* and *richness* of the soil in forests, it must be remembered that these two states are partly caused by the growth itself, and that if the trees were cut away, and the ground ploughed up, the dampness at once would disappear, and the richness be extracted by a few years of agricultural cropping

It may be asked—how is it that the present sál coppice forests exist? The reply is, that the people who have had the cutting out of stems have only felled out here and there, taking the stems they required, leaving many that were not fit for their wants, and thus securing a certain amount of protection. In Akona, for instance, there are plenty of pollarded stems on the ground, but the treatment they have received is such that only a few straight poles for building can be got out of the forests; whereas if the forests had been cut on a regular plan, there would have been plenty of stems, not only for the people in the immediate vicinity, but for a large population all round the forests. But we can trace on the ground where sál coppices once were, which, being overworked, have degenerated into unfertile waste lands, with only a few hardy thorns on them.

In the past two or three years I have made some small experiments in strip felling in a small plot near Mahofe (Pilibhít); here, though the young growth in the open is killed by the frost, the undergrowth, where sheltered by forest on both sides, was untouched by frost.

In the past three springs I have made experiments in strip felling in Akona, where the forest is for the most part pollarded sál from 25 to 30 feet high, I cut in strips 8¼, 16½, 49½ and 66 feet broad. I am inclined to think that 16½ feet strips are best suited for the height of the forest, the soil, and the growth: 8¼ feet did not give enough light, except in very thin and low forests, any small advantages gained are, I think, counterbalanced by the difficulty of working such narrow strips and by the expense; 16½ feet gave enough light, the stems were well drawn up and straight, and the grass there, not having too much light, was not excessive in its growth, whereas it was in the broader strips (it would do much damage to the re-growth if fired); and the re-growth in the broader strips did not seem to me so straight or well grown. In October last I visited the strip fellings and found that the dominant coppice shoots (which would form the principal growth of the future) on an average showed 7 feet high for the first year's growth, 12 feet high for the second year's growth, and 16 feet high for the third year's growth; giving respectively 7, 5, and 4 feet a year.

From the first I noticed that the top of every coppice shoot was cut off by some sort of flying beetle or grasshopper which must have done its work in the rains; but I am glad to say that the damage is not lasting, a side shoot taking the place (as a rule) of the killed shoot, though in many cases there was a bifurcation. On the whole, however, the damage is not much. Besides the coppice shoots in the strips, I examined every coppice shoot I came across in the forests, not in the strips, and found the same thing; so that it is evident that almost every coppice shoot is eaten over yearly, and that the trees generally recover their straightness with the next year's growth, though

many bifurcate ; but I have the consolation in believing that all our straight coppice growth in Bhira, Bahraich, Gonda, and Gorakhpur has undergone the same treatment.

The insect eats the bark almost all round the shoot about 6 inches from the top, so the shoot either dies and drops off, or is weakened, so that one or more of the shoots in the axils of the leaves below the damaged part takes its place ; but there is generally no permanent injury done to the interior of the stem ; there are generally small bulges where the new shoots originated, which, as the trees grow older, gradually disappear. The damage of bifurcation, however, might be remedied, if it were found worth doing so, by cutting away one of the contending shoots after a year or two. The tops of the rapidly-grown coppice shoots (many making as much as 10 and 12 feet growth from the ground in the first eight months after the original stem was cut over) are extremely succulent, and thus attractive to the insects ; whereas seedlings, which are not so attacked, are slower growing (having only young roots), and are consequently not so juicy. I expect the crookedness of the coppice in some forests is more due to the attacks of insects and frost than to the hot winds to which Dr. Brandis was inclined to attribute the injury in the coppice forests of Nawábganj (Gonda Division).

I give in the accompanying diagram, (*Fig.* 1, *Plate* I.) a representation of a theoretical felling in strips. I have adopted the width of the periodic* strip at 16½ feet, as I think it best for coppice forests of the height we shall most probably have to treat sál coppice in the first rotation at least, say from 25 to 33 feet ; this width is also convenient to work with, as a mile of periodic strip covers two acres, every furlong one-fourth of an acre. I have also taken four periodic strips, *i.e.*, $16\frac{1}{2}' \times 4 = 66'$, as my complete strip and basis for working. "Four" is the first number in which after cutting the primary strip I get a *central* strip that I can cut out in the second period ; five gives unequal spaces after the first strip ; six leaves five, giving a central strip with two on each side, but the area to be worked over is greater. With a fourfold strip in a 24 years' rotation I work over one-sixth of the forest : with a sixfold strip I have to work over one-fourth of the forest, (*Figs.* 1, 2, 3, *Plate* II.) Thus in a forest I cut out the primary periodic strips AA (*Fig.* 4) in the first period, they have full grown forest CC and DD on both sides, till CC and DD are cut over in the third and fourth periods respectively. BB being cut in the second period, have

* By "period" is meant the number of years that it takes to get round the number of compartments into which the forest is theoretically divided, with one periodic strip, (in the same way "rotation" means the number of years it takes to work the four periodic strips, *i e*, the whole forest) thus if there were four theoretical compartments, the "period" would be one of four years, and the "rotation" 16 The periodic strips are primary "A," secondary "B," tertiary "C," and fourth in order "D."

the full height of the forest on both sides till the beginning of the third period, when strips CC are cut, and till the beginning of the fourth period, when strips DD are cut. CC fare worst of all: when they are cut the growth AA is of two periods, and that of BB only one; whereas DD when cut have on one side AA with a growth of three periods, and BB with a growth of two periods.

Thus, according as the rotation is to be 16, 20, 24, 28, or 32 years, I would divide the forest in which I am working (that is, one "working circle") into 4, 5, 6, 7, or 8 compartments of about equal size and yield.*

For simplicity's sake in the diagram I have taken a rotation of 16 years, in which the fellings would be as below :—

Year of felling.	Location of felling.		
1	Compartment I.,	Strip A,	Primary periodic strip.
2	„ II.,	„ A,	„ „ „
3	„ III.,	„ A,	„ „ „
4	„ IV.,	„ A,	„ „ „
5	„ I.,	„ B,	Secondary „ „
6	„ II.,	„ B,	„ „ „
7	„ III.,	„ B,	„ „ „
8	„ IV.,	„ B,	„ „ „
9	„ I.,	„ C,	Tertiary „ „
10	„ II.,	„ C,	„ „ „
11	„ III,	„ C,	„ „ „
12	„ IV.,	„ C,	„ „ „
13	„ I.,	„ D,	Fourth „ „
14	„ II.,	„ D,	„ „ „
15	„ III,	„ D,	„ „ „
16	„ IV.,	„ D,	„ „ „

The rotation is equal to the number of periodic strips four in number (a number which remains always constant), multiplied by the number of compartments (which varies).

At the end of the rotation the age of the growth in the various strips would be as below, and the strips could be again worked in the same rotation if it were necessary to do so :—

Compartment I.,	Strip A,	16 years.
„ II.,	„ A,	15 „
„ III.,	„ A,	14 „
„ IV.,	„ A,	13 „
„ I.,	„ B,	12 „

* As shown hereafter, the rotation can in practise be made for any number of years, and not merely for multiples of four.

Compartment II.,	Strip	B,	11 years.
„ III.,	„	B,	10 „
„ IV.,	„	B,	9 „
„ I.,	„	C,	8 „
„ II.,	„	C,	7 „
„ III.,	„	C,	6 „
„ IV.,	„	C,	5 „
„ I.,	„	D,	4 „
„ II.,	„	D,	3 „
„ III.,	„	D,	2 „
„ IV.,	„	D,	1 year.

As I have shown the danger of felling in large areas at one time, it may be asked—why not divide the working circle into, say, four compartments (or more according to length of the rotation), thinning out one-fourth of the stock of compartment I. in the 1st year, one-fourth of compartment II. in the 2nd year, one-fourth of compartment III. in the 3rd year, one-fourth of compartment IV. in the 4th year, then returning to compartment I. in the 5th, 9th, and 13th years, compartment II. in the 6th, 10th, and 14th years, compartment III. in the 7th, 11th, and 15th years, compartment IV. in the 8th, 12th, and 16th years? The advantages of the strip system of felling over the system of periodic thinnings I will endeavour to give in paragraph 21.

There remains, therefore, I think, only another system of cutting over, *viz.*, in small plots, say squares; but this aggravates the one disadvantage of the strip system, as it would require very much more time and expense in marking these plots on the ground, and there is the other great disadvantage that the produce would have to be removed either through growing forest or through new growth, and the work would be extremely difficult to supervise.

The advantages of the strip system over periodic thinnings will, I think, be those given below :—

(*a*). The strips being marked on the ground, or rather the centre of the primary strip, everything is (as a rule) cut over flush with the ground, the outturn is more regular, and nothing is left for the workmen to do but to fell and cut up the produce; in the thinning system the chief man would have to mark one tree in four in the first thinning, one in three in the second, one in two in the third, leaving everything in the fourth to be cut over, or leave the work to the discretion of the workmen; but there would always be the danger of the chief man's marking re-growth of former thinnings for the final thinnings, he might even mark for felling in the second and third periods re-growth of the first period. In the strip system the work after it

is laid out is merely mechanical; in the thinning much observation is necessary. In the strip system good and bad (or rather bad and very bad) are cut together; in the thinning system opportunity is given to the marker of the trees to favour intending purchasers, leaving worse stuff for the future, which it might be difficult to dispose of.

(*b*). In the strip system everything (or nearly everything) is felled over on the strips, and in removing the cut produce no damage need be done to the new growth of coppice, as the strips are cut flush with the ground, and the shoots do not appear above ground till after all the cut produce should have been removed; and, again, the produce once removed there is no traffic over the strip for the whole of the existing rotation; in the thinning system removing the cut produce four times* in each compartment must always do much harm to the growing stock, particularly in the last thinnings, when the ground is covered with tender coppice shoots, the result of previous thinnings.

(*c*). In the strip system, even if the rotation cannot be worked up to on account of a bad market, as the periodic strips follow regularly in the numbered compartments, there would be no irregularity in the succession of the fellings though the rotation might be longer; in the thinning system it would be much more difficult to know where the work left off, so as to take it up properly the following year or period.

(*d*). In the strip system the work being open to the directing and traffic lines can be much better examined and controlled than in the thinning system, which takes place among tree growth and at considerable distances from roads.

(*e*). In the strip system the shoots, having no cover overhead, will, as a rule, form straighter stems than in the thinning system, where the shoots will have to grow under partial cover; in the latter they will grow towards the light, wherever it may be.

(*f*). In the strip system, the work being easier controlled, the stumps will be cut better than in the thinning system. In the strip system the controlling officer has merely to inspect the area felled over; in the thinning system he would have to go over four

* If we remove the produce in less than four times, we should be probably thinning too much, and the strip system would have the advantage of a more gradual thinning

times as much ground, with growth far more difficult to inspect. Felling by contract will be much more easy to control in the strip than in the thinning system.

(*g*). Should it be desired to leave any number of standards per acre for seed or for larger timber, in the strip system this can be well left till the third or fourth strip periods; thus if it be desired to leave 50 standards per acre, in the strip system one has merely to make a simple calculation. The complete strip of 66 feet, 660 feet long, contains 1 acre, 25 trees in the third and fourth periodic strips have to be left standing on one furlong of 660 feet, that is, the trees to be left would be about $\frac{660'}{25} = \frac{132'}{5} = 26\frac{4}{5}$ feet apart. In the four thinnings it would be much more difficult to select and mark the trees that were to remain as standards; their distance apart could not without much labour and expense be so well regulated as in the strip system.

(*h*). In the strip system there is a better chance of seedlings springing up, as though they have shade they have no cover, and thus get the dew, and they run no risk of being trampled over as any seedlings that may come up do in the thinning system, on the removal of produce in the succeeding thinnings.

(*i*). In the strip system, the area worked over may any moment be ascertained; whereas it is extremely difficult, without fresh measuring, to ascertain the exact area that has been thinned.

(*j*). In the strip system, everything being felled over a certain space, the falling trees can fall upon the trees already on the ground, and thus do no damage to standing stock; whereas in the thinning system in the last three thinnings the trees felled must necessarily fall upon the young growth, to its probable damage and possible destruction.

There is one disadvantage that I have found in the strip system, and that is the expense in laying out the work in the first period; great care has to be taken in such narrow strips that they are exactly parallel to each other, otherwise the following periodic strips will run together; but when the work is once systematised this disadvantage will, I hope, disappear; a careful man on Rs. 5 or Rs. 6 a month with a good eye can easily run a straight line if one or two directing poles are laid down for him from the directing line, to which the strips should run at right angles. If secondary light lines (guide lines) about a furlong or

more apart, and parallel to the directing line, be laid down beforehand, and pegs placed on them 66 feet apart, no error would be allowed to accumulate. When the first periodic strip has been felled the felling out of the middle strip in the second period comes easy, and in the third and fourth periods it only remains to cut out the strips left standing which can easily be distinguished from the new growth of the first and second periodic strips.

In practice we may do away with the theoretical equal compartments,* taking care, however, to work the primary strip in a systematic manner, that it will not be difficult to follow the same order in the second, third, and fourth periods. If the demand is equal to or more than the supply, the working plan can be exactly worked up to ; but if the demand is less than the supply, or not constant, as long as the proper order is followed in all four periods, there will practically be no harm done ; the rotation will be longer (a fault generally on the right side), or we can make up for our scant fellings of one or more years by heavier fellings when there is a demand. Thus, suppose in a working circle, with a 16 years' rotation, we have an area of 10 square miles = 6,400 acres, the area to be cut over annually is $\frac{6400}{16}$ = 400 acres; this means 200 miles of strip: now if we can sell only 150 miles of strip this year, we may sell 250 miles the next ; or if we take 20 instead of 16 years to complete the rotation, the succession of the fellings is not vitiated ; and though we may not have sold so much as we wanted to, we are really no worse off as we have four years stored up capital, and in the future there is no doubt the demand will be more than the supply. One thing we must not do, and that is, cut more than the sum of the annual yield up to date.

Of course cattle must not be admitted, the area must be protected from fire, and people must not be allowed to go whenever they like with carts, loads, elephants, amongst the young growth, or even alone whenever they can tread down young coppice or seedlings: a certain amount should be made into roads and paths to prevent the people from being inconvenienced.

The longer the forest has been fire-protected and cattle excluded, the better will be the chance of the new growth ; and in our newly-protected forests it may be found that the growths of the third and fourth periods will in many cases catch up the growths of the first and second periods, as they will have a much richer soil to start growing in.

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* In dividing the forest into compartments we must make the division lines in such directions that they may act as traffic or inspection roads, and by making the roads suit the convenience of the villagers, we take away from them any excuse for wandering in the closed forests.

Before commencing operations it is (even for thinnings) necessary, a year or two before, to kill out all the climbers, otherwise the work will be very expensive, as the cut trees are entangled with the standing ones, and cannot be extricated without much labour.

The strips should meet the chief traffic line of the compartment which may or may not be the directing line. Much expense is saved if it is so, and it should be so unless, for special reasons, a particular direction has to be given to the strips. If the traffic and directing line be not one and the same, the directing line should be laid at right angles to the proposed direction of the strips (it need not be more than 2 inches broad).* The 66 feet spaces (*Fig.* 5) should be all pegged out on the edge of the directing line before work is commenced, with stout sál pegs which will last many years, and just before working light lines should be run parallel, according to the density of the forest at one or two or more furlongs distance from the directing line, or the strips may run out to the open country to which the produce may be carted away; these light guide lines being also pegged every 66 feet commencing with a point at right angles to a peg on the directing line; there will be no danger of any error occurring in running the primary strips and the mixing up of the others afterwards: the primary strips will be always guides to the latter workings.

As to the direction of the strips themselves, as a rule I do not think it of much importance for the growth; as a matter of convenience I prefer having the work done north and south, thus the man who lays out the lines can work with a prismatic compass over the needle without having to think of the angles, and in very frosty places I think the young growth in the cold weather is all the better for being shaded in the early morning from the rays of the sun. This is effected by having standing strips of forest running north and south; a plane table is convenient to mark off the strips with when the directing line is made.

In cutting the strips all damaging cover of trees on either side should be cut away. The tendency in cutting the primary strip has been to make them broader than 16½ feet; this should be seen to, as if it be too much, the third and fourth periodic strips will be too narrow; this difficulty is, however, partially removed practically as the timber on the third and fourth periodic strips, being some years older than that cut over on the first and second periodic strips, will yield more produce to the acre than the strips first cut over.† The reason the primary strips have been cut too wide is that in running the first light line for the primary strips, we have taken the light

* The directing line is the line to which the strips run at right angles.

† But we should sometimes have to leave standards in the third and fourth periodic strips; so the more correctly we work the better.

lines as the edges of the strips ; in running these lines small clearings have to be made for the men to work in, and consequently part of the strips DD are cut into. This may be obviated in future in laying out the light lines, by taking the light lines from the pegs as before, but taking the light lines as the centres of the primary strips, instead of the edges as before, and felling 8¼ feet on both sides of them ; in this manner anything that has been felled either to the right or left of the light lines will properly come within the breadth (16½ feet) of the primary strips.

The work of cutting should be commenced in November, and all the material should be removed off the strips before the 15th of March, so that no damage be done to young shoots which will come up directly the warm weather commences. The material, if not sold on the spot, should be stacked in the vicinity to dry, and be carefully guarded against fire, the carting of the material to market, particularly if the market be distant, should not be commenced till the fuel be dry, otherwise there will be much loss in carriage.

I will not here go into the subject of taking from the felled stuff the bark which in time I hope will fetch as much as, or more than, the wood itself.

As a rule everything should be cut over flush with the ground in the first and second periodic strips, as it is of importance to get a long, uninterrupted view of the strip ; but if any promising straight young stems are left standing on them, they should be trimmed carefully of any side branches up to a height of 6 feet from the ground, so that the view up the strip may be interrupted as little as possible. The standards so left should also be painted with white paint at 5 feet from the ground with a ring one inch broad, so that, in examining the growth afterwards, young standards may not be mistaken for fresh coppice shoots. In the third and fourth periodic strips, the strips being bounded by the originally straight cut strips, there is not the same necessity for the long, uninterrupted view.

I do not advocate the adoption of the strip system for all coppice sál forests ; there may be many coppice forests in which a great part of the growing stock consists of straight stems, and where it would be better for the improvement of the forest to content ourselves with cutting out the inferior stems : but even here a modification of the strip system might be adopted, cutting in much broader strips instead of cutting all over the forest, thus concentrating work and doing away with many of the disadvantages which I have shown are inseparable from frequent periodic thinnings all over a forest. In thinnings, when they are done at long intervals of time, little harm is done to the young growth by removing produce ; it is where the removals are often that the damage is so great.

Strip fellings may, I believe, be conducted in some of our

high sál forests with advantage, taking out all crooked and unsound trees of all ages when a market can be found for the produce, and this particularly in places where the standing stock is bad, the breadth of the strip will depend upon the height and density of the forest, a broad strip of high forest between the cut over strips would tend to keep them partially shaded for some hours of the day, prevent too rapid evaporation from the ground, and yield moisture to the new growth. The periods would necessarily be of much longer duration than in coppice forests, and all the stock that would improve by keeping till the next felling would be left. In fact Dr. Brandis, in his suggestions of 1881,* when treating of the Motipur forests of Bahraich, pointed out the possibility of such a system being some day pursued. The late Inspector-General had just seen in his inspection the splendid young growth on the Nipál boundary line, which, together with experience gained in other forests, led me to make my experiments in Bhira in 1876-77.

I have stated the disadvantage of the strip system, *viz.*, the expense of marking out the strips on the ground: this is a known expense, but I am of opinion that in conducting operations that have not only for their immediate object the supply of timber and fuel and the getting rid of bad stuff, but the ultimate object of greatly improving the forest, the expense (provided the work be carried out properly) is a fair charge against forest improvement, and I believe the superiority of the work and the greater economy with which it can be conducted and the advantages obtained will fully compensate for the initial expense.

E. WOOD; *Captain,*
Conservator of Forests, N.-W. P. and Oudh, Oudh Circle.

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* Page 27. End of first part of paragraph 78.

IV. Extracts from Official Gazettes.

1.—Gazette of India—

No. 740.—*The 28th July, 1885.*—*Mr. J. E. Barrett, sub. pro tem.* Assistant Conservator of Forests of the 2nd grade in the Punjab, will revert to his officiating appointment of Assistant Conservator of Forests of the 3rd grade, with effect from the 29th June, 1885.

No. 2190.—*The 11th August, 1885.*—*Mr. A. E. Lowrie,* Assistant Conservator of Forests, Ajmere-Merwara, is granted twenty days' privilege leave, with effect from the 20th August, 1885.

No. 825.—*The 18th August, 1885.*—*Mr. C. Bagshawe,* Deputy Conservator of Forests of the 2nd grade in the North-Western Provinces and Oudh, is appointed to officiate in the 1st grade of Deputy Conservators during the absence on three months' privilege leave of *Captain C. W. Losack,* Deputy Conservator of the 1st grade in the Central Provinces, with effect from the 9th August, 1885.

2.—Calcutta Gazette—

The 29th July, 1885.—*Babu Sreedhur Chuckerbutty,* Sub-Assistant Conservator of Forests, Singbhoom, in temporary charge of the Palamow sub-division of the Chota Nagpore Division, is allowed privilege leave for three months, under Section 138, Chapter X. of the Civil Leave Code, with effect from the date on which *Mr. C. A. G. Lillingston,* Assistant Conservator of Forests, Palamow sub-division, rejoined his post after the expiration of the privilege leave of one month granted in the notification, dated 11th June, 1885, published in the *Calcutta Gazette* of the 17th idem, or from such other date as he may avail himself of it.

Mr. F. B. Manson, Deputy Conservator of Forests, Chota Nagpore Division, will hold charge of the Singbhoom sub-division, in addition to his other duties, during the absence, on privilege leave, of *Babu Sreedhur Chuckerbutty.*

3.—North-Western Provinces and Oudh Gazette—

No. $\frac{2811}{\text{II-279-2-1}}$.—*The 29th July, 1885.*—With effect from the 12th June, 1885, the date on which *Mr. F. B. Bryant* proceeded on leave:—

Mr. A. G. Hobart-Hampden, Assistant Conservator of Forests, 2nd grade, to officiate as Assistant Conservator of Forests, 1st grade.

No. $\frac{2917}{\text{II-445-5-12}}$.—*The 7th August, 1885.—Major J. E. Campbell*, Deputy Conservator of Forests, from the charge of the Gonda Division to that of the Pilibhit Division of the Oudh Circle.

No. $\frac{2968}{\text{II-445-9-1}}$.—*The 12th August, 1885.—Mr. B. A. Rebsch*, Assistant Conservator of Forests, from the Kheri to the Gonda Division of the Oudh Circle, with effect from the 18th July, 1885.

4.—PUNJAB GAZETTE—

No. 827.—*The 29th July, 1885.—Mr. E. S. Carr*, Assistant Conservator of Forests, Mooltan Division, is granted three months' privilege leave with effect from the afternoon of the 9th July, 1885.

Mr. J. E. Barrett, Assistant Conservator of Forests, is placed in charge of the Mooltan Division during *Mr. Carr's* absence on privilege leave or until further orders.

No. 840.—*The 30th July, 1885.*—With reference to the Notification by the Government of India, No. 107 F., dated the 6th of February 1885, appointing *Mr. A. L. McIntire*, an Assistant Conservator of Forests, 3rd grade, and posting him to the Punjab, it is hereby notified that *Mr. McIntire* was posted to the Lahore Division, which he joined on the 28th of November, 1884.

No. 883.—*The 5th August, 1885.*—With the approval of the Government of India, the Honorable the Lieutenant-Governor is pleased to appoint *Munshi Fazl Din*, Ranger, a Probationary Sub-Assistant Conservator of Forests, with effect from the 24th of March, 1885.

5.—CENTRAL PROVINCES GAZETTE—

No. 2271.—*The 18th June, 1885.*—Consequent on the deputation of *Mr. R. H. C. Whittall*, Deputy Conservator of Forests, 3rd grade, as Assistant Inspector General of Forests, the following temporary promotion is made, with effect from the 20th March last:—

Mr. G. F. Prevost, Deputy Conservator of Forests, 4th grade (in Berar), to officiate as Deputy Conservator of Forests, 3rd grade. Notification No. 1476 of 21st April last is hereby cancelled.

No. 2823.—*The 28th July, 1885.*—With the approval and sanction of the Government of India, *Mr. R. H. E. Thompson*, Deputy Conservator of Forests of the 1st grade, is placed on special duty, from 21st May last, in connection with the revision of the existing system of administration adopted for the second class Forest Reserves in the Central Provinces.

No. 3158.—*The 18th August, 1885.—Mr. E. Dobbs*, Assistant Conservator of Forests, received charge of the Seoni Division from *Mr. F. C. Hicks*, on the afternoon of the 6th ultimo.

No. 3230.—*The 22nd August, 1885.—Mr. F. C. Hicks*, Assistant Conservator of Forests, on being relieved by *Mr. Dobbs*, remained attached to the Seoni Division till the 23rd ultimo.

Mr. F. C. Hicks, Assistant Conservator of Forests, is transferred to the Chhinewara Division, which he joined on the 25th ultimo.

6.—British Burmah Gazette—

No. 42.—*The 21st July, 1885.*—The following promotion is ordered in the Forest Department, with effect from the 3rd June, 1885:—

Mr. H. Slade, Assistant Conservator of Forests, 2nd grade, to be Assistant Conservator, 1st grade, and to officiate as Deputy Conservator, 4th grade.

No. 43.—*The 23rd July, 1885.*—Under the provisions of sections 71 to 74 of the Civil Leave Code, privilege leave for one month and six days is granted to *Captain C. T. Bingham*, Deputy Conservator of Forests, with effect from the date on which he may avail himself of it.

No. 46.—*The 28th July, 1885.—Mr. T. H. Aplin*, Deputy Conservator of Forests, is posted to the charge of the Western Division, during the absence on privilege leave of *Captain C. T. Bingham*, or until further orders.

7.—Assam Gazette—

No. 255.—*The 29th July, 1885.—Mr. J. T. Jellicoe*, Deputy Conservator of Forests, made over charge of the Darrang and Nowgong Forest Division to *Babu Jagesvar Sur*, Sub-Assistant Conservator of Forests, on the afternoon of the 18th July, 1885, and availed himself of privilege leave from the forenoon of the 19th idem.

No. 268.—*The 5th August, 1885.—Mr. C. G. D. Fordyce*, Assistant Conservator of Forests, returned from privilege leave, and took over charge of the Sibságar Forest Division, on the forenoon of the 29th July, 1885, from Forest Ranger *Babu Sri Gopal Banerji.*

No. 277.—*The 13th August, 1885.*—Privilege leave of absence for six weeks, under Section 138, Chapter X. of the Civil Leave Code, is granted to *Mr. D. P. Copeland*, Assistant Conservator of Forests, with effect from the 15th August, 1885, or the subsequent date on which he may avail himself of it.

No. 278.—During the absence of *Mr. D. P. Copeland*, *Babu Ram Gopal Khan*, Extra Assistant Commissioner, will be in charge of the Goálpara Forest Division.

No. 280.—*Mr. T. J. Campbell*, Assistant Conservator of For-

ests, made over charge of the Gáro Hills Forest-Division to *Mr. W. B. Savi*, District Superintendent of Police, and availed himself of privilege leave on the forenoon of the 6th August, 1885.

8.—MYSORE GAZETTE—

Nil.

9.—MADRAS GAZETTE—

Nil.

10.—BOMBAY GAZETTE—

No. 5977.—*The 24th July, 1885.*—The following Resolution of Government is published for general information :—

"No. 5977 of 1885, REVENUE DEPARTMENT, *Bombay Castle, 24th July, 1885.*

RESOLUTION OF GOVERNMENT.

"The Governor in Council wishing to secure an efficient management of forests, and believing that the conservancy of forests and the maintenance of the rights of the Crown is beneficial to the interests of the people in providing for a continuous supply of timber; wishing to secure the agricultural wants of the people and the privileges they have hitherto enjoyed for the legitimate fulfilment of these wants; convinced that where friction has arisen in the management of forests, especially in Thana, such friction is due to a misunderstanding which can be removed; desirous to give to all parties concerned the means of bringing their views before Government—institutes a Commission of which the Acting Collector of Thána will be Chairman, and Members—

Ráo Bahádur Dáji Govind Gupté,
Ráo Bahádur Krishnáji Lakshman Nulkar,
Edward Charles Ozanne, Esq., C.S., M.R.A.C.,
Lieut.-Colonel William Peyton, M.S.C.,
Robert Charles Wroughton, Esq.,
Ráo Bahádur Yeshvant Moreshvar Kelkar,*

"2. The Commission will be placed in possession before they begin their inquiries of a clear statement of the present regulations concerning forest administration showing what are the rights of Government and the privileges enjoyed by forest and non-forest villagers and the wild tribes.

"3. The labour of the Commission will be mainly directed—

(*a*), to hearing complaints and ascertaining their reality;

(*b*), to the consideration of the best manner in which provision can be made for supplying the wants of the resident agriculturists as distinct from trade demands;

(*c*), to the situation of the wild tribes whether insufficient alternative provision has been made in any case of transfer

* (Member and Secretary).

of cultivation out of forests and insufficient employment has been found for them to enlist their sympathy.

(*d*), to the suggestion of means whereby the regulations of Government may best be made intelligible to the people and a hearty co-operation secured in their enforcement.

"4. To illustrate further the object of Government in appointing the Commission some questions are brought under their notice on which the Government would desire to have the benefit of their opinion. Where scientific experiments are needed—as in the case of ráb—the Commission will take counsel with experts who—like the Principal of the College of Science at Poona—are able to give valuable evidence on the subject.

"5. The Commission will not lose sight of the fact that forest settlements are in progress and the respective areas of reserved and protected forests not yet settled and the effect of working plans on the supply of forest produce still unknown."

QUESTIONS REFERRED TO IN PARA. 4 OF THE RESOLUTION.

Rab.

1. For what food crops, if any, other than rice, is ráb needed by the cultivator?
2. If so, what proportion of land is ordinarily required for the collection of materials for "ráb" per acre of such crops?
3. Are there any, and if so, what trees, whose boughs and foliage are peculiarly valued as "ráb" material? And are they of descriptions of timber trees which it is essential to reserve, or which in the Thána District attain a size which make them valuable as timber in the commercial sense of the world?
4. Is it possible for the Forest Department to supply villages in the vicinity of forests, which have heretofore obtained their "ráb" materials from the forests, with such materials, at a cost (even cost price) within the cultivators' means, and at the times when, and in or sufficiently near the places where they need "rab"?
5. If the reply to the above question be in the negative, should the cultivator be permitted to enter the forests, reserved or protected, to collect "ráb" materials? If so under what restrictions in either case?
6. Is there any present substitute for "tahál" (boughs, bushes and foliage) as "ráb" material? Could any be hereafter grown supplied or maintained?

Villagers in Villages in the vicinity of Forests.

Their domestic, agricultural and household wants.

1. Have the villagers sufficient facilities in obtaining wood for fuel, for building, for agricultural implements and the like, at a reasonably low price? If not, how and to what extent should they be supplied?

2. Might not the system of small fellings in numerous convenient spots be introduced by the Forest Department, from which the villagers could draw their supplies and small local industries obtain what fuel they need?
3. Is the grazing area in villages in the vicinity of forests sufficient, and ought any and what further grazing privileges to be accorded in Government forests and with what restrictions?
4. What measures would yet further secure the hearty co-operation of the resident agricultural population in forest conservancy? And might it not be declared that the abuse of privileges may lead to a withdrawal of them from offending villages, for a term or for ever?

Wild Tribes.

1. Are the wild tribes sufficiently paid for forest produce collected by them?
2. Are they as much employed as they might be by the Forest Department?
3. In short, is every effort made to enlist their sympathies and identify their interests with those of the Forest Department?

THE TRADE.

1. Ought the system of passes for firewood and bamboos to be maintained after settlement?
2. Ought the depôt system to be abandoned, or might it not, with advantage, be extended for the supply of trade?
3. Ought export and sale of forest produce otherwise than from depôts to be prohibited, and if not, what measures ought to be taken to prevent traders utilizing privileges given to agricultural residents and the wild tribes?

NOTICE.

A list has been received from the Manager of the Delhi and London Bank, Mussoorie, showing that many Subscribers to the 'Indian Forester' have not yet paid their subscriptions for Vol. X. As the cost of publication is barely covered by the amount of the subscriptions, it is hoped that these gentlemen will kindly send remittances without further delay, and a post card has now been sent to each of them as a reminder.

It is proposed to publish the names of Subscribers whose subscriptions are more than one year in arrears, and it is hoped that after due notice has here been given, that our supporters will not take offence at this necessary procedure.

Subscribers are also reminded that subscriptions for Vol. XI. are already due.